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Book reviews and notices

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General

Ainsworth & Bisby's dictionary of the fungi. Edited by Paul M. Kirk, Paul F. Cannon, David W. Minter & Joost A. Stalpers. 2008. 10th edn. CAB International, Nosworthy Way, Wallingford, Oxon OX10 8DE, UK <orders@cabi.org>. Pp. xi + 771, figs 34, tables 4. ISBN 978-085199-826-8. Price £ 70, US $ 149, 110 €.

In reviewing the ninth edition of the Dictionary, published in 2001, Korf (Mycotaxon 82: 475, 2002) commented: "None of us can afford not to have a copy of this book at arm's length." Is it necessary to say more for the Bible of mycology? This Dictionary was first published in 1943, a direct result of Geoffrey Ainsworth and Guy Bisby's nightly wartime fire-watching duties at the then Imperial Mycological Institute at Kew, and recounted in more detail by Ainsworth in his Preface to the seventh edition of 1983 – the first to be produced from a computerized database. The 360-page 2 cm thick pocket-sized book of 1943 has now swelled to a doorstop-like tome, with pages almost twice the size and a thickness of 5½ cm. Its production has also involved an expanding number of mycologists, now 45 in addition to the four editors (but ten fewer than in the eighth edition of 1995). But if you own a copy of the eighth or ninth, should every mycologist buy this one as well? For the new edition the answer has to be resoundingly positive, as this is the first to start to fully reflect the spectacular advancement made in our understanding of fungal relationships through molecular phylogenetics. Pleasingly, it still treats all organisms studied by mycologists, my personal definition of "fungi". However, the chromistan and protozoan fungal group entries are somewhat irritatingly now relegated

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to separate listings at the back – meaning that the user needs to know a genus' affinity to decide where to look for its entry. In this tenth edition a particular effort has been made to add additional biographical entries to enhance the international outlook of the work, as well as including genera and higher taxa described since the last edition; many of the individual entries have also been updated. However, in the Preface it is noted that limited resources precluded the updating of essay-type entries, which has been "incomplete and imperfect", and some now bear health-warnings to draw attention to that. There is also no systematic listing of genera by order and family as in the previous two editions, and the (admittedly imperfect) key to families last seen in the eighth of 1995 has not returned. Indeed, the editors raise the issue of whether a key to families can be constructed when so much of the higher phylogeny is increasingly molecularly defined. At least, diagnoses of the accepted families and higher taxa are provided, with four family names validated here (on p. x, and without MycoBank numbers): *Gallaceaceae*, *Helicobasidiaceae*, *Sclerogastraceae*, and *Trappeaceae*. Surprisingly, and many would consider inappropriately for a dictionary, the new generic name *Naumovoxyma* is also introduced as a replacement for *Naumovia* Kurtzman 2003 (non Dobrozr. 1928), with two combinations into it made.

The number of accepted members of the kingdom *Fungi* is now given as 75 337 genera and 97 330 species (p. 474), a substantial jump from the 80 602 species given in the 2001 edition. But, as the editors acknowledge, these figures are both likely to be an overestimates as they are derived by upwards addition for entries without making allowances for a synonymy level of 2.5:1 or possible double-counting of separately named anamorphs. In reality, however, there may well be 100-120,000 described good species, but they reside amongst the "orphans" not assigned to currently accepted genera totaled here. The front cover of the new edition, as the ninth, just has "Dictionary of the fungi" as the title, while the title pages have "Ainsworth & Bisby's dictionary of the fungi". This last title was introduced by Geoffrey Ainsworth for the fifth edition of 1961, following the death of Bisby in 1958, and has been maintained since. However, using only the shortened title on the cover has inevitably led to the correct title not be cited in the reference lists of publications.

There are a few line figures scattered through the text, as in the previous two editions, but it seems there must have been some re-ordering as they are not numbered sequentially, with Fig. 34 on p. 632 and Fig. 24 on p. 690!

Now with "more than 21,000 entries", according to the back cover, it would be invidious to criticize individual ones, though it would have been good to have the spelling of "Stramenopiles" corrected to "Straminopiles" in Fig. 31. Having had a personal hand in the 1971, 1983, and 1995 editions, I guess I am aware more than most of the practical problems and hard work involved in

preparing editions of this work. However, as Geoffrey Ainsworth remarked to me when the 1983 edition appeared, we had cleaned up many former errors but also introduced new ones. As first commented in the 1995 edition (not the 2001 one as stated in the Preface!), it will continue to be "a marvelously imperfect work needed by all". But having reached its 65th, should the Dictionary now be "retired"? In the Preface the editors proclaim that this "may well be the last 'ink-on-paper' version" but also note that any next edition would be produced after the current editors have all retired from full-time employment. While I personally find hard-copy books quicker to search for information than online databases and would be very sad if this were the last one for the Dictionary, it is the availability of compilers more than the information delivery method that I see as the greater problem. Even as the proofs were arriving, the scanning of incoming world literature and making notes and corrections for the next edition commenced used to be the normal practice at the Institute – plans for at least the data capture aspect for any possible eleventh edition need to be put into place now, if this has not been done already. If not, mycology will be in danger of losing its Bible.

Schimmelpilze und deren Bestimmung. By Liliane E. Petrini & Orlando Petrini. 2008. 2nd edn. J. Cramer in der Gebrüder Borntraeger Verlagsbuchhandlung, Johannesstrasse 3A, D-70176 Stuttgart, Germany <mail@schweizerbart.de>. Pp. vii + 147, figs 28, tables 9. [Bibliotheca Mycologica no. 204.] ISBN 978-3-443-59106-9. Price 38 €.

The first edition of this introduction to the identification of mould genera was issued in 2002 (see Mycotaxon 86: 480–481, 2003) where the reviewer commented that "the main potential . . . clearly lies in the fact that it is written in German." This is also true for this new edition, in which very little has been changed. The overall length and all but a handful of pages are identical, and, remarkably, even the price is the same. The only significant change appears to be a modification of the key on p. 52 to include an extra couplet to separate *Monascus* and *Xeromyces* anamorphs from *Trichothecium,* which has a knock-on effect in the numbering of couplets that continues to p. 56. The latest reference in the "Literatur" is from 2002; however I did find a "Gams 2006" and "Samson et al. 2004" cited in the text (p. 99) but these were not added to "Literatur". It is most unfortunate that the chance was not taken to update the classification and to see "Deuteromycetes" perpetuated as a main heading, correct typographical errors from the first printing, and to use uncorrected author citations: for example, *Aspergillus* should be attributed to "P. Micheli ex Link" not "Mich. : Fr.", *Rhizopus* to "Ehrenb." not "Ehrenb. ex Corda", and *Thamidium* to "Link" not "Link ex Wallr." Sadly, such errors are likely to be perpetuated – when (in my view) they would have been better omitted throughout, as this is not a

taxonomic work but merely an identification guide. A positive point, however, is that many of the photomicrographs have evidently benefited from improved digital technology and now have heightened contrast. If there is some need for a guide in German to genera of moulds, it would have been better to completely revise this work rather than re-issue what is little more than a straight reprint. As the authors are both distinguished mycologists with excellent reputations, I am confident that they could have produced a book that was more authoritative and reflected our current knowledge of mould fungi rather than that of the later decades of the 20th century.

Forest fungi of central India. By R.K. Verma, Nidhi Sharma. K.K. Soni & Jamaluddin. 2008. International Book Distributing, Khushnuma Complex Basement, 7 Meerabai Marg (behind Jawahar Bhawan), Lucknow 226 001, U. P., India <ibdco@airtelbroadband.in>. Pp. 418, figs 503, tables 3. ISBN 81-8189-338-3. Price Rs 2100.

When I first saw this title, I assumed that it must be devoted exclusively to macromycetes, but was pleased to find it endeavoured to "compile all fungi occurring in forest of Madhya Pradesh and Chattisgarth" states (p. iii). This is a most welcome initiative of the Tropical Forest Research Institute in Jabalpur and treats 269 species, of which only 65 are basidiomycetes. This total came from field collections made at just 15 sites, and also soil isolations; just how many times these sites were visited and at what times of the year is not stated. The result can therefore be but a snapshot rather than a full inventory. Indeed, such a number must surely represent well under 10 % of the fungi actually present in the area covered. At least the authors are evidently aware of the real extent of fungal diversity, as they comment that "of the estimated 6 million fungi only 405.7 thousand have been catalogued" (p. 1) – a statement that is unreferenced and one in which I would have to question both figures on the current information analyses I am aware of. However, while the number of species covered may be modest, almost half (133 taxa) are of especial interest. Two new genera are described (*Acrodictyiella* for a dematiaceous hyphomycetes, and *Kamalomyces* in *Tubeufiaceae*) as are 22 new species, 31 species newly recorded for India, and 98 species with new host records. The identifications and recognition of new taxa seem to have been based on published literature (pp. 8–9) rather than by consulting national and international specialists. This is commendable in one respect, and Dr Verma in particular has previously described many new fungi from India, but this makes me worry how many of the new taxa will stand up to more critical scrutiny over time — particularly as some are placed in very speciose genera such as *Acremonium*, *Corynespora, Hypoxylon, Phyllachora, Pseudocercospora,* and *Pseudospiropes*. It would have been preferable to publish the new taxa separately in peer-reviewed journals, which would also have

made them more accessible to mycologists in general; perhaps the authors can be encouraged to deposit information on these in MycoBank now they have appeared (no MycoBank numbers are listed in the accounts).

Irritatingly, the species are arranged in a systematic rather than an alphabetical system by order, but this is more than compensated for by the information on places of publication and synonyms, detailed descriptions, information on hosts, details of collections examined, notes on occurrences outside India, and especially illustrations that include many of infected host leaves as well as line drawings and photomicrographs. Some of the host photographs are in colour, as is a portrait of Kamal, teacher of — and I am sure an inspiration to — the first two authors of the volume. Following the species accounts, there are tables summarizing the records both "forest wise" and "treewise" — the latter including 161 tree species — a bibliography, and index to fungus names.

Overall, this book cannot but be considered a major contribution to our knowledge of the mycobiota of the region. It is also no mean achievement for the authors to have produced this largely unaided, even though that potentially has a downside; I fear that this will increasingly be the case as the numbers of taxonomic mycologists in the west continue to decline. The book will be of value for ecologists, foresters, and pathologists as well as mycologists endeavouring to identify fungi from the forests of central India, and will also be required by systematic mycology libraries generally in view of the newly described taxa it contains.

Hongos de parques y jardines y sus relaciones con la gente. By Gastón Guzmán. 2008. Secretaría de Educación de Veracruz, km 4.5 Carretera Federal Xalapa-Veracruz, C. P. 91190 Xalapa, Veracruz, México. Pp. 242, col. figs 366. ISBN 978-970-670-170-1. Price not indicated.

The issue of gardens and wildlife has assumed a heightened awareness in the UK over the last few years, leading to the publication of several books and a Wildlife Gardening Forum that runs scientific meetings. It therefore came as something of a surprise to find that Mexico was already ahead in this game, at least as regards fungi, but I am sure this is largely a result of Gastón's campaigning. Entirely in Spanish, the first 40 pages address a series of questions that might be expected from the general public, such as: Are there very poisonous fungi in a park or garden?, What is fungus and how do you study them?, and What is the difference between edible and poisonous fungi? There are also pages on the importance of knowing about fungi, types of poisoning, and how to collect and preserve them. Children and young people feature strongly in the colour photographs illustrating these first sections. The heart of the book, however, comprises information on around 125 fungi. Each individual species, or sometimes genus, has at least one, and in some cases two, full pages with symbols

indicating edibility, toxicity, hallucinogenic nature (with stars!), or medical uses — with large colour photographs dominating. The systematic coverage is wide-ranging, and I was gratified to see some lichens included. The work ends with a rather full glossary, a list of recommended books, an index to Mexican common names, and another question: How many fungi are there in Mexico and how many of these are hallucinogenic? He estimates 200,000, discusses the initiation of Wasson into Mexican hallucinogenic mushrooms he arranged in 1953, and indicates that 50 are known in Mexico and South America compared with about 15 in the USA and 10 in Europe. It is great to see Gastón, 77 years old this year, still so actively promoting the public understanding of fungi and clearly getting the message through to the state authorities and convincing them to publish such a work.

Gljive Srbije i zapadnog Balkana [Fungi of Serbia and the Balkans]. By Branislav Uzelac. 2009. BGV Logik, Crvenih Hrastova, Cerak, 11030 Beograd, Serbia <english@glijvari.org.rs> *or* <goran.milosevic@poducavanje.co.rs>. Pp. 464, col. photographs *ca* 1200. ISBN 978-86-912677-0-4. Price 120 €.

This beautiful book, entirely in Serbian apart from the Foreword by Ann Pringle (Harvard University) and Acknowledgements, covers all major macromycetes found in Serbia and the western Balkans. The author is a well-known natural history TV-presenter and scientific writer in Serbia who previously prepared Jestive Glijvei i Lišajevi [Edible Fungi and Lichens] in 2006 (a book that I have not seen). He is also the founder and President of the Mycologist's Association of Serbia and has been working on this guide along with his Association colleagues since 2003. It starts with a 21-page overview of what fungi are and their overall classification, stressing their position with respect to other kingdoms and introducing aspects of life-cycles, ecology, identification, edibility, cultivation, poison syndromes, and value as bioindicators. Almost the whole of the remaining book is devoted to species, and covers over 1500, of which around 1200 are illustrated in superb colour; apart from 102 ascomycetes, all those illustrated are basidiomycetes. These are preceded not by any formal key but by a series of 22 annotated boxed colour illustrations that directs the user to particular page-spans – a pragmatic approach I do not recall having seen used before in such a work and I am sure will help a great deal.

The species are arranged in a modern phylogenetic system by orders and families (sometimes grouped together) and also within them, which complicates locating particular taxa without recourse to the index. There are three species per page in a double-column format in which the inner columns have the text and the outer the photographs. This is very user-friendly and is almost identical to that in the Encyclopedia of Fungi (Jordan 2004). The text has the accepted name and author citation, ordinal placement, selected synonyms,

sometimes a Serbian name, and information on morphology, microscopic features, chemical reactions, edibility, habitat, and distribution, sometimes with additional comments as well. The selection of species also includes photographs of some that are rarely illustrated, such as *Amanita velosa*, *Rickenella mellea*, and *Xerocomus persicolor*. The book finishes with a glossary, indices to scientific and Serbian names, and four pages of references.

Of course there are slips, such as the spelling "*Corficiales*" for "*Corticiales*" (p. 71), and a misunderstanding over the use of the colon in citations as in *Tubaria hiemalis* "Romagnesi : Bon" rather than "Romagnesi ex Bon" (p. 351). And I am sure some macrofungal specialists would argue as to whether the species in all photographs were correctly identified. But these minutiae do not detract from the quality of the coloured images that make the volume a joy to leaf-through. This will be major stimulus to field mycology in the region, something recognized by the financial contributions towards the cost of publication received from Roger Phillips personally, the New Phytologist Trust, and three Serbian agencies. I understand that the possibility of a version in English is being explored, but in case that proves impractical, if you want a copy it should be ordered promptly as only 1000 copies have been printed and these will be much in demand in the region!

Jordan M (2004) The Encyclopedia of Fungi of Britain and Europe. London: Frances Lincoln.

A preliminary checklist of micromycetes in Poland. Edited by Wiesław Mułenko, Tomasz Majewski & Małgorzata Ruszkiewicz-Michalska. 2008. W. Szafer Institute of Botany, Polish Academy of Sciences, Lubicz 46, PL-31-512 Kraków, Poland <ed-office@ib-pan.krakow.pl>. Pp. 752. [Biodiversity of Poland no. 9.] ISBN 978-83-89648-75-4. Price 74 €.

Earlier volumes in this series have covered the larger basidiomycetes (see Mycotaxon 94: 379-380, 2005), larger ascomycetes (102: 446, 2007), lichens and lichenicolous fungi (94: 387, 2005), and slime moulds (90: 235-236, 2004). This new volume covers all other fungal groups, including other ascomycetes and basidiomycetes, chytrids, glomeromycetes, hypochytrids, oomycetes, plasmodiophoromycetes, and zygomycetes along with conidial fungi. It has no fewer than 16 contributors, and the genera or other groups they have been responsible for are detailed (p. 6); it is consequently very much a national effort. The species are treated alphabetically within phyla and orders, and for each there is information on the substratum (including hosts) and references to the literature reporting them (selected in the case of especially common fungi). In only exceptional cases are there commenting notes. Synonyms are included in the alphabetical sequences and cross-referenced to the accepted names, a commendable and economical way to present this information, which means

that only genera needed to be included in the final index. This somewhat utilitarian treatment was unavoidable if a manageable volume were to be produced, as an impressive 5969 species are covered, of which by far the largest groups are the hyphomycetes (1574 species) and coelomycetes (1628 species). Yet the editors realize they are still far from a complete checklist of these groups, hence the "preliminary" in the title. In addition to as yet undiscovered taxa, they also note that much applied Polish mycological literature in particular has still to be searched. This may not be definitive, but it is a commendable overview and quick-reference to which of these fungi are known from the country, which will be of value both to mycologists and plant pathologists. Also, while the bibliographic searching may not have been as thorough as the editors would considered ideal, the reference list included nevertheless does occupy 53 pages and so provides an important entry-point into the Polish microfungal literature.

Diversity, ecology, and conservation of truffle fungi in forests of the Pacific Northwest. By James M. Trappe, Randy Molina, Daniel L. Luoma, Efren Cázares, David Pilz, Jane E. Smith, Michael A. Castellano, Steven L. Miller & Matthew J. Trappe. 2009. US Department of Agriculture Forest Service, Pacific Northwest Research Station, 333 SW First Avenue, P. O. Box 3890, Portland, OR 97208-3890, USA <pnw_pnwpubs@fs.fed.us>. Pp. 194, figs 91, tables 4, CD. [General Technical Report no. PNW-GTR-772.] ISBN not indicated. Price not indicated.

The abstract proclaims the Pacific Northwest has been an epicentre for the evolution of truffles. With 350 species dispersed through 55 genera. there would certainly be no current contenders, although southeast Australia may eventually prove to be a rival. It is pleasing to see the USDA Forest Service continuing to support mycological survey and conservation, but this report covers much more than that. The introductory sections cover the nature of truffles, where they occur, and a history of truffle science in the Pacific Northwest that has biographical notes and portraits of key players from Vittadini through Gilkey and Harkness to modern times and including Trappe, Molina, and Castellano. There follow remarks on truffle evolution as revealed by molecular phylogenetics, discussion of the "secotioid syndrome" (i.e. the now well-established evolution of hypogeous fruiting bodies from epigeous ancestors), and a biogeographical analysis. A table demonstrates the present ranges and inferred origins of the genera present in the Pacific Northwest. The thorny issue of nomenclature is addressed, and the problems and solutions are illustrated by the protracted history of *Schenella simplex*, originally described as a slime mould but now recognized as representing a separate family of basidiomycete truffles in the *Geastrales*.

Following an outline classification showing the various genera assigned to family is a description of the genera. These are arranged alphabetically, and each has a full page with information on the etymology, characters, number of species, distribution, seasonality, references to keys and descriptions, comments, and a coloured photograph showing both intact and sliced sporocarps. No illustrations or photomicrographs are included, which was disappointing to me as so many of these fungi have such wonderful spores. There is a series of four keys to the genera, but as this work is not intended as a comprehensive identification guide, there are no keys to species. However, the CD inside the back cover has fine macrophotographs of 111 species, as well as a movie "A truffle hunt with Jim Trappe," showing him in action with his special truffle rake.

This book could be seen as a series of courses in a menu, and the next continues to delight. Entitled "Ecology of truffles", it has the best coloured shots of mycorrhizal roots sheathed by truffle fungi that I have seen in print, some from synthesis cultures and others from nature. The authors stress that, compared to ectomycorrhizal mushrooms, these fungi typically display narrow host ranges – often to a single host genus, such as *Alpova diplophloeus*, which is evidently restricted to *Alnus*. The importance of truffles in ecosystem processes is discussed in relation to nutrient cycling and soil structure, mycorrhizal networks, soil food webs, and small mammal mycophagy. The mycophagy can be obligate, preferential, or casual, but is documented here for no less than 45 mammals and birds in the Pacific Northwest, including bears, chipmunks, goats, gophers, jays, marmots, voles, and even the high-profile Northern spotted owl. If you need examples to help sell the importance of fungi in the conservation arena, there is no shortage of striking examples here. Following discussion of the effects of different silvicultural practices, implications for wildlife, and inoculation procedures, the next course is on gastronomy with tempting dishes displayed, and naturally leads to cultivation in plantations and the conservation of natural resources. The dessert is a 3⅓ page summary of 12 principles of management practices and considerations that merit promulgation throughout the conservation and forestry audiences, and I trust this will be given a wider circulation than in this one report.

This is splendid work that all fungal conservationists could read with benefit to "provide the underpinning for conserving this fascinating and important group of forest organisms" (p. 164). There is no price indicated, but somewhat dauntingly the back cover bears the warning: "Penalty for private use, $300." I do hope that should be interpreted as meaning that if you do receive or otherwise obtain a copy, you risk a fine for not sharing the information it contains!

Field guide to North American truffles: hunting, identifying, and enjoying the world's most prized fungi. By Matt Trappe, Frank Evans & James Trappe. 2007. Ten Speed Press, P. O. Box 7123, Berkeley, CA 94707, USA <www.tenspeed.com>. Pp. 136, figs in colour. ISBN 978-1-58008-862-6. Price US $ 16.95.

This is a real pocket-sized guide, dealing with 90 species. Following a poignant 19-page introduction designed for the general naturalist, each species is conveniently treated alphabetically on a separate page. In addition to information on the systematic position, season, distribution, habitat, spores, features, and palatability are colour photographs of sliced and unsliced sporocarps — supplemented in most cases by the photomicrographs of ascospores I missed in the Forest Service Report reviewed above. Much of the data has been contributed by members of the North American Truffling Society (NATS) from their personal field knowledge of these fungi. On the back cover, Paul Stamets comments, "An amazing accomplishment – this is the best field guide to truffles ever published!" It is clear all North American field mycologists should have a copy.

Oomycetes

***Phytophthora*: Identifying species by morphology and DNA fingerprints.** By Mannon E. Gallegly and Chuanxue Hong. 2008. APS Press, American Phytopathological Society, 340 Pilot Knob Road, Saint Paul, MN 55121, USA; <aps@scisoc.org>. Pp. 168, figs 130.ISBN 978-0-89054-364-1. Price US $ 79.

Phytophthora remains a serious threat to the health of plants worldwide, yet species identification is challenging, even for *Phytophthora* specialists. This spiral-bound book will thus be a welcome addition to the bookshelf (or laboratory bench) of those involved in identifying isolates to species. This practical guide culminates a lengthy study in which the authors have assembled isolates of nearly 60 species from which they have developed an effective morphological key combined with a method of DNA-based fingerprinting. The work nicely complements the seminal Mycological Papers produced at the former International Mycological Institute, and the detailed text by Erwin and Ribeiro published by the APS in 1996.

Undoubtedly the authors have taken the correct approach in combining molecular and morphological methods to identify each species, and this rigour is a major strength. The double-page format for each species is a success with much data presented clearly and succinctly at a level of detail appropriate to the book's objectives (i.e. a practical guide to species identification). Their two keys well complement each other to clearly delineate most of the examined species.

However, no key is perfect, and, as acknowledged by the authors, there are several challenges. A perennial one is keeping such reference works up to date

given the pace of discovery in the genus. Inevitably, many recently described *Phytophthora* species are missing, and updated editions or even web-based supplements would thus be welcome. It is also noted that the SSCP method for analysing the sequence variation in the ITS regions has limitations. Improved availability and reductions in price are turning laboratories to DNA sequencing as the method of choice. Sequencing provides the ultimate base-by-base resolution, and is pretty straightforward and rapid to run compared to restriction enzyme digestion or SSCP. Matching SSCP fingerprints is also challenging; ideally the fingerprint profile of the unknown isolate should be run directly alongside that of suitable reference strains, which may not be available in the user's laboratory. By comparison, a DNA sequence may be readily matched to the very large databases via BLAST sequence similarity methods. Lastly, there are clearly problematic taxa where no key or single method will provide a definitive identity. A range of undescribed taxa within ITS clade 6 have, for example, been reported. Many of these are considered sterile and a key that depends upon morphological features of the sexual structures will obviously fail to identify such taxa. Sequence variation within defined morphospecies will also be a problem as acknowledged in *P. cryptogea*, *P. megasperma*, and *P. citricola*. Some of these taxonomic inconsistencies have been, or are in the process of being, unraveled and any new editions will need to acknowledge this progress.

Other quibbles: Descriptions or images of the colony morphology on standard growth media and reference to the ITS sequences (where known) would have been helpful. The authors assert that the pictures are simply to "show the morphology . . . with no attempt to show the fine details", but it is a pity that the quality of the micrographs is not higher. Lastly, it is surprising that the micrographs of "definitive morphological characters" do not include examples of amphigynous and paragynous antheridia.

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Basidiomycetes

Funga Nordica: agaricoid, boletoid and cyphelloid genera. Edited by Henning Knudsen & Jan Vesterholt. 2008. Nordsvamp, c/o Botanical Museum, Gothersgade 130, DK-1123 Copenhagen, Denmark. Pp. 965, figs, DVD. ISBN 978-87-983961-3-0. Price 99-119 €, £ 75-106, US $ 148-176.

This work is surely destined to become the work for the identification of northern European mushrooms for decades to come. It represents a herculean effort involving 41 mycologists from 16 countries and covers 2675 species from

the Nordic countries, plus another 114 known from neighbouring ones that might be expected in the Nordic area. Following introductory sections on the methodology used, vegetation zones and provinces, abbreviations employed for characters and references to illustrations, and a glossary (with most useful line drawings on the terminology for spore and cystidium shapes), are the all-important keys to genera. There are seven main keys based on easily recognized features such as fruit body types, hymenium types, and spore deposit colour – and then one to the orders covered. The arrangement is then by order, family, and genus, arranged by order and family and not alphabetically. I found — and I am sure many users will find — this most frustrating, necessitating repeated reference to the inside back cover that does list the pages on which individual genera are to be found. Preferably keys to families, and then genera, could have been collected together, and even a synoptic classification presented over one or two pages, but with the genera still treated alphabetically as is done in The Lichens of Great Britain and Ireland (reviewed below). Another pragmatic refinement to consider for a future edition would be the inclusion of backtracking numbers in parentheses after couplet numbers in the keys, something I always find helpful in endeavouring to determine where I went wrong when the trail leads to a most unlikely taxon!

The bulk of the work comprises descriptions of families and genera, and then keys to the species with a treasure-chest of information where they are keyed out. In addition to morphological and anatomical details necessary for a correct diagnosis, there is information on ecology, distribution, conservation status in particular countries (using IUCN categories), references to selected colour illustrations, and synonyms given in parentheses. The issue of edibility is probably wisely avoided, but poisonous or hallucinogenic species are flagged. Author citations of scientific names are provided throughout, but with no reference to the place of publication or even the year of the work; at least the latter would have been helpful, though information on both authors and dates is no longer as useful as was formerly the case as this information is now available online and free from the Index Fungorum database.

Illustrations in the text are limited to line-drawings of critical features, but that is more than compensated for by the DVD attached to the inside back cover which has over 4000 coloured images, as well as PDF versions of the keys, in a new version (3.1) of MycoKey (version 2.1 is reviewed in Mycotaxon 102: 434-5, 2007). Species featured on the DVD are indicated by a symbol of concentric rings at the end of the text where they are keyed out.

The accounts are very much at the cutting edge of mushroom taxonomy, with both very recently described species and some names even in press. The latter include the new family name *Chromocyphellaceae* cited as "Knudsen in press" with a reference to "Petersen, Knudsen & Seberg (in press)", but that work

is not listed in the 20 pages of references compiled near the end of the book. Critical notes on six species are presented separately, and 14 new combinations are made (but sadly not with MycoBank reference numbers). As I am not a specialist of basidiomycete taxonomy, but rather a consumer of the results, it would be invidious of me to comment on particular changes in names at generic or species levels except to say that some re-learning will be occasioned. The main text concludes by an index of scientific names arranged by genus and species, but not one by species epithet alone that would have been helpful as a short cut for users such as myself behind with agaric redispositions.

On a separate point, I was intrigued to see the use of "*Funga*" in the title as a term equivalent to "*Flora*" but for fungi. As far as I am aware, "funga" was first used in this sense in Gravesen (2000), and for me it is to be preferred to "mycota" as the latter term implies a phylum and so diminishes the hierarchical standing of the organisms – although "mycobiota" is perhaps more self-explanatory to non-mycologists and so might be preferred (Hawksworth 2000).

A remarkable achievement, especially as the project only "took off" in January 2006 with the goal of completion within two years (p. 11), on which all involved merit the heartiest congratulations. This book, complementing Horak's (2005; reviewed in Mycotaxon 96: 336, 2006) keys to the central European species, now empowers "amateur" mycologists throughout Europe as never before to name so many of the fungi they collect but previously could not locate in the plethora of field guides. No macromycetologist should be without a copy, but do shop-around as advertised prices vary considerably!

Gravesen S, 2000. Microbiology on Indoor Air '99 – what is new and interesting? An overview of selected papers presented in Edinburgh, August 1999. Indoor Air 10: 74-80.

Hawksworth DL, 2000. Mycobiota, mycota or funga? Mycological Research 104: 1283.

Horak E, 2005. Röhrlinge und Blätterpilze in Europa. Heidelberg: Elsevier Spektrum Akademisker Verlag.

Torikseened Soomes ja Eestis. By Tuomo Niemelä. 2008. [Translated by Erast Parmasto.] Eesti Loodusfoto, Tartu, Estonia. Pp. 320, col. figs 301. ISBN 978-87-9985-830-86-4. Price not indicated.

This book on the pore fungi of Finland and Estonia is a translation in Estonian of Niemelä's Käävät, Puiden Sienet, which was published as a number of Norrlinia in Finnish in 2005; sadly it was missed by Mycotaxon at the time. The original book covered 230 species known in Finland, plus 11 found in neighbouring areas of Estonia and Sweden. In making the translation, Erast has reduced the information on distribution and ecology in Finland and added information on the 211 species occurring in Estonia, with Niemelä adding photographs of four Estonian species. The coloured photographs are superb, and it is pleasing to see the vouchers for all clearly indicated in the figure legends. Short descriptions and keys are provided, but there are no drawings

or photographs of microscopic features. Even though this is in Estonian, it will be a boon to all wishing to name polypores in the region. The translation was made possible by a grant from the Estonian Environmental Investment Centre, and Erast writes that about a third of the print run was being distributed free of charge to staff and students in Estonian universities, forest pathologists, nature conservationists, and amateur mycologists. Erast further comments that "thanks to the possibility to have such a translation, I spared some years of my life: otherwise I had to compile [a] similar book (as I had promised many years), surely not better that Tuomo's one". What better recommendation could there be than that?!

Pilzkompendium. Band 2. By Erhard Ludwig. 2007. Fungicon-Verlag, Saalower Straße 42, D-12307 Berlin, Germany; <erhardludwig@GMX.de>. Pp. 723 (text volume) + plates 205 (plates volume). ISBN 978-3-940316-01-1 (text); 978-3-940316-00-4 (plates). Price 72 € (text) + 138 € (plates).

This is the second part of a *magnum opus* aiming to illustrate and describe all the European agarics (plus some other macrofungi) in twelve volumes. This would be a major challenge for a well-funded consortium of mycologists, but Erhard Ludwig is writing, painting, and publishing the whole series himself. To tackle such a project on one's own is a remarkable achievement. To tackle it successfully is simply astonishing.

Each part consists of a volume of text together with a large-format (34 x 24 cm) volume of coloured plates. The first part, published in 2001 (and not received for review by Mycotaxon) dealt with 89 small genera of agarics and has proved extremely useful as a convenient first source of information on these often neglected species. An unfamiliar agaric found in England in 2008 was, for example, quickly tracked down to the genus *Callistosporium* (not previously known in Britain) thanks to *Pilzkompendium*.

This second part is subtitled 'The larger genera of *Agaricales* with coloured spores (except *Cortinariaceae*)' and as such deals with *Agaricus* (plus *Allopsalliota*), *Conocybe*, *Coprinus* (inclusive of *Coprinellus*, *Coprinopsis*, and *Parasola*), *Entoloma*, *Lacrymaria*, *Pholiotina*, *Pluteus*, and *Psathyrella*. Altogether, 547 species are illustrated and described.

The text is in German, but each taxon entry starts with a brief English summary. Separate paragraphs then note macro- and microscopic characters, similar species, literature references, and details of the collections pictured. Line drawings illustrate microscopic details. An abbreviated key (leading one to groups of taxa, rather than individual species) is provided for each genus.

The plates are impressive and beautifully produced. Watercolour paintings of fungi can often be amateurish in the worst sense – flat, over-stylized, or oddly coloured. But Erhard Ludwig is an excellent illustrator and his artwork is lifelike

and convincing. Each taxon is illustrated by a range of specimens shown life-size or larger and often taken from two or more collections. *Agaricus subperonatus*, for example, is illustrated by 14 specimens from four collections, enabling the author to show variations in colour, size, and form; *Entoloma cetratum* is illustrated by more than 30 specimens from eight collections. All are clearly cross-referenced to collection data in the text volume. Most of the watercolours are painted from life – the result of extensive foraying going back at least 30 years. Some, however, are based on original or published photographs.

Surprisingly, no fewer than 33 new taxa (species, varieties, and forms) are described in the text, with additional taxa (some as yet unnamed) provisionally described. The author notes that several specialists, including A. Hausknecht and M. E. Noordeloos, have been consulted – indeed some of the new *Entoloma* taxa are jointly described with the latter author – but this still seems an awful lot of novelties for a non-molecular study in a mycobiota that is comparatively well-known. It might have been better to have published the new taxa in a peer-reviewed journal, particularly since the cost of these two volumes may put them beyond the reach of many individual mycologists.

Despite (or perhaps because of) the high price tag, these are handsome volumes, extremely well illustrated, and thoroughly documented. If you can afford them, buy them. They will certainly bring you a great deal of pleasure.

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Annotated list of polypores for the Iberian Peninsula and Balearic Islands. By I. Melo, J. Cardoso & M.T. Telleria. 2007. J. Cramer in der Gebrüder Borntraeger Verlagsbuchhandlung, D-14129 Berlin, Germany <mail@schweizerbart.de>. Pp. 183, figs 1. [Bibliotheca Mycologica no. 203.] ISBN 978-3-443-59105-2. Price 54 €.

This checklist embraces the names of all polypores reported from the region, but is far more than a naked list. For each species, which are listed alphabetically, information is given on places of publication of the names and synonyms, the types, distribution down to the level of provinces, substrata (with tree species named), and collections in the region holding material of the taxon. There is also a substantial 44 pages of "bibliography surveyed" in compiling the checklist in addition to eight of works cited, and a comprehensive index by epithet. Sadly, the work is marred for me by a failure to understand the bibliographic references and dates to be accorded to sanctioned fungal names. For example, "*Polyporus ulmarius* Sowerby: Fr." only has the reference to the place of sanctioning, which is indicated as the basionym [!], and not to Sowerby's original publication, where the true basionym is to be found. Also, the use of "in" in author citations does not follow the recent Codes. These may seem small points, but it is a reality that errors in standard checklists become perpetuated

though being copied into other publications and databases. Nevertheless, this work is destined to be the key reference point on the polypores of the region, and will also be of value to amateurs because of the provincial data included. The authors are to be congratulated on drawing all this information together, and it is to be hoped that it will be the spur to additional volumes on these fungi in the Flora Micológica Ibérica series.

Die Gattung *Ramaria* in Deutschland. Monografie zur Gattung *Ramaria* in Deutschland, mit Bestimmungsschlüssel zu den europäischen Arten. By Josef Christan. 2008. IHW-Verlag, Eching, Germany. Pp. 352, figs 334 (mostly coloured). ISBN 978-3-930167-71-5. Price 98 €.

The attractive species of *Ramaria* (mainly subgenus *Ramaria*) are often indicative of healthy and biodiverse habitats; they are among the first to suffer from environmental stress and so form valuable bioindicators. Thorough studies of recent decades have shown that the taxonomy of the genus is difficult and only a few specialists have been able to identify species reliably according to the scattered modern literature. Because of this, previous indications about ecology and distribution must be regarded with the utmost reservation. The publication of this comprehensive monograph for Europe was impatiently expected by the mycological community. The beautiful, thoroughly documented, and attractively produced book has finally appeared. It is undoubtedly useful for the whole of Europe, but also beyond, and not only because of the keys.

An introductory chapter of 53 pages deals with historical illustrated works, in which old plates are faithfully reproduced and critically discussed; they often serve as iconotypes of the treated species. Macroscopic and microscopic features are then exhaustively described and illustrated in good drawings. Without a microscope no reliable species identification is possible. The shape, size and ornamentation of spores, presence of clamp connections at the base of the basidia, and hyphal structures provide the most important characters. Accurate drawings of the spores are given for all species at 3500 × magnification. Among the macroscopic features, the fruit body colour that varies with age is still relevant. For an accurate characterization, besides vernacular descriptive terms, symbols from the colour codes by Küppers in DuMont's Colour Atlas (1984, 1999) are given, from which only one 2-dimensional plate is reproduced at the end of the book (yellow–magenta). High quality colour photographs also provide the necessary information for each species. The taxonomic situation of the genus is dealt with on 12 pages (more extensively in Zeitschrift für Mykologie 71: 7–42, 2005). Four subgenera are distinguished. The largest, *Ramaria*, with its biggest section *Formosae*, *Lentoramaria* (e.g. *R. stricta*), *Echinoramaria*, and *Asteroramaria* (with the still insufficiently resolved *R. ochraceovirens* complex). Papers dealing with DNA analyses are equally referenced, which support this

subdivision that correlates surprisingly well with micromorphological and ecological findings. *Gomphus* and *Ramaria* subgenus *Ramaria* are recognized as closest relatives, whilst the remaining subgenera are more distantly related and may eventually require generic segregation. A recent study by Hosaka et al. from the AFTOL project (Mycologia 98: 949-959, 2007) provides additional evidence for this.

Two different keys (both in German and in English) lead to the European species: Key I circumvents the taxonomic structures outlined above and leads directly to the species (and is particularly suited for beginners); while Key II first separates the subgenera and sections, and is more suited for use by advanced students who are familiar with these higher categories. The second key gives more emphasis to microscopical features.

The species known in Germany are dealt with in alphabetic sequence for each subgenus and section, each on two pages, with a full description, good colour illustrations, critical remarks on the species concept, and a brief characterization in English. The removal of lists of material examined, SEM micrographs of spores, and diagrams of spore sizes to later sections made this economical layout possible. Questions of nomenclature are also dealt with in a competent way. The perhaps surprising citation of the genus as *Ramaria* Fr. ex Bonord. (although the name is much older) is due to a conservation proposal. *Ramaria aurea* and *R. rufescens* were recognized by Fries as distinct species only in 1838, and these names are not sanctioned in Systema Mycologicum (1821-32). Conversely, the names *R. flaccida* and *R. suecica* were sanctioned by Fries. In the case of type varieties of a species, it should also be noted that the authors should be cited immediately after the species epithet, not after the varietal name.

That only very few minor details and a limited number of printing errors could be criticized testifies to the unusually high standard of this book. This is in all its parts the work of an assiduous mycological amateur, who, with close contact with professional and other mycologists specializing in this genus, has produced an admirable work, for which field mycologists will owe him thanks.

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***Phaeocollybia* of Pacific Northwest North America.** By Lorelei L. Norvell & Ronald L. Exeter. 2008. US Department of the Interior, Bureau of Land Management, Salem District, 1717 Fabry Road SE, Salem, OR 97306, USA <Ronald_Exeter@blm.gov>. Pp. 228, 440 colour photos, 25 drawings. ISBN 978-0-9791310-1-1. Price US $ 71.

The Pacific Northwest is believed to be the most highly diverse region of the world for *Phaeocollybia* species, with 25 species recognized of which ten have

been most recently described as new to science from the region. The authors provide a world checklist listing 79 species; most of those not known in the Pacific Northwest being from elsewhere in the Americas, Australasia (17 species) or Asia (9) – with only six in Europe. However, 14 of the species had been identified as "of concern" with respect to their conservation status, and that occasioned a more detailed survey leading to this splendid regional monograph that has occupied so much of the non-editorial time of Lorelei in particular for over 15 years, in the field, herbaria, libraries, and the laboratory. So intensive has been their survey work that now no species in the region is considered "threatened or endangered", although 13 are categorized as "rare". The numbers of known sites in British Columbia, California, Idaho, Oregon, and Washington are tabled, with Oregon emerging as the ultimate *Phaeocollybia* treasure chest. The species are now established as being ectomycorrhizal rather than saprotrophic, primarily as a result of Lorelei's studies. Effects of logging and forest age are discussed; while smaller patch cuts appear to result in a more rapid return to fruiting, the richest stands for these fungi were ~150-200 years old. Before the systematic treatment, there is well-illustrated survey of the developmental biology and anatomy of the genus, including a neat classification of "pseudorhizal" types, i.e. the basal downward extension or branching of the stipes that are so important in the taxonomy of this genus.

The taxonomic part starts with a detailed account of the genus, sections proposed, an unrooted molecularly-based tree showing the phylogenetic relationships between all 25 treated species, comparisons with other genera, information on macro- micro- and chemical characters, and identification procedures. The information included ranges from subtle odours such as "potato/pansy" to fluorescence under UV-light and syringaldazine reactivity – another chemical to be added to the rank of dropping bottles ranged by the microscope. The key characters of the species are summarized in a table (p. 33), and a synopsis of the accepted species, synonyms, and excluded species precedes two keys, one using all characters and the other only microscopic features. Species treatments are packed with information including nomenclature, synonyms and misapplied names, typifications, field characters, ecology, separation from similar species, often a range of colour photographs of the habit, photomicrographs, line drawings (portrayed shadowed as if on sheets straight from Lorelei's sketch pad), and key references.

There is a complete bibliography, extensive glossary, and finally a concluding colour photograph showing Lorelei in "Oz", an old growth Bureau of Land Management Reserve Forest in Polk County, Oregon. The authors designate this as "an official phaeocollybian Garden of Eden" as it yielded no fewer than 11 *Phaeocollybia* species. The whole is most attractively produced, with the dedication and enthusiasm of the authors for their "pets" evident

throughout. This study is also instructive in that neither of the authors is based in a university, museum, or other research institute. Lorelei is an independent professional mycologist, while Ron is a botanist in the Salem District Bureau of Land Management that published it. This monograph again demonstrates how the highest mycological standards can be achieved by dedicated unaffiliated mycologists.

As well as being a major contribution to securing the conservation of many of these fungi, this will be a delight to use in identifying *Phaeocollybia*'s worldwide, and not just in the Pacific Northwest. My only niggle is that the cover of my copy was torn on arrival; was this down to impatience when packing by the Senior Systems Administrator depicted at the foot of the last page? (i.e., one of Lorelei's cats . . . . who was probably be as relieved as Lorelei and Ron to see this work in print.)

Champignons sans noms! Vol. 1. By J. Schopfer. 2006. B. Schopfer, Amselweg 5, CH 1793 Jeuss, Switzerland. Pp. 347. ISBN none given. Price not given, but around 145 CHF.

This is a rather odd, self-published book by the late John Schopfer. It effectively consists of his illustrated notes (in French) on a variety of fungi collected either locally in Switzerland or elsewhere in Europe, from Norway to France, Spain, and Italy. Some 80 basidiomycetes, mostly agarics, are featured, plus 32 ascomycetes, and eight myxomycetes. All are accompanied by photographs plus descriptions of macro- and microcharacters. Some of these fungi are tentatively named, while others are given provisional names in the hope that, perhaps, they might represent new species. At the end of the volume are some observations on the appearance of fungal sporocarps linked to phases of the moon; the author concludes that there is no meaningful correlation.

One can certainly sympathize with John Schopfer's difficulties in finding convincing names for all his collections. However, many such problems could have been solved by not attempting to identify everything single-handed. For example, the author's mysterious pink *Clavaria* species with spiny spores – here dubbed '*C. pseudorosea*' – is the '*stellifera*' morph of *C. incarnata*. But to discover this, you would need to know the specialist literature on this group of fungi or contact someone who does.

Many herbaria have unpublished notes similar to these that are extremely useful when examining specimens, and the book would certainly be of value in this context (the author appears to have retained herbarium specimens, although there is no indication where). Otherwise, it is difficult to think of a use for the volume. It is certainly well produced and the photographs are of a high standard, but the rather random mix of species, the lack of authoritative

determinations, and the comparatively high price will not endear it to potential purchasers.

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Ascomycetes

Taxonomy, phylogeny, and ecology of bark-inhabiting tree-pathogenic fungi in the *Cryphonectriaceae*. By Marieka Gryzenhout, Brenda D. Wingfield & Michael J. Wingfield. 2009. APS Press, American Phytopathological Society, 340 Pilot Knob Road, Saint Paul, MN 55121, USA <aps@scisoc.org>. Pp. x + 119, col. figs 14, other figs 38. ISBN 978-0-89054-367-2. Price US $ 119.

This family includes some of the most devastating fungal pathogens of trees, most famously the causal agent of Chestnut blight (*Cryphonectria parasitica*) that spectacularly almost destroyed the American chestnut (*Castanea dentata*) in North America while seriously damaging the European chestnut (*C. sativa*) in the early 1900s. From around 1980, *Cryphonectria cubensis* and some allied species have been causing serious problems on *Eucalyptus* trees. Yet the family has only recently started to be examined critically, and this has led to the recognition of no less than nine new genera and many new species related to *Cryphonectria* and *Endothia* in the last few years as a result of careful molecular and morphological studies – especially involving the first author, and some of the results are published here for the first time. However, no synthesis of all the new information now available has previously been made.

The first 39 pages of this book focus on the diseases these fungi cause, their distributions, control, and molecular systematics. Following these sections, there are dichotomous and synoptic keys to the genera – and then the heart of the work, formal taxonomic treatments with full nomenclatural information, detailed descriptions (including ones of cultures), data on hosts and distribution, details of specimens examined, excellent line drawings and photomicrographs, and often extensive "Notes". Twenty-two species are accepted, and these are now referred to eleven different genera. A further four species are excluded as belonging elsewhere, and several others of "questionable" status (not "validity" as used in the section headings, as all the names seem to be validly published) are discussed.

Such studies may at first be assumed to be remote and somewhat irrelevant by many hands-on plant pathologists, but in reality they are the essential underpinning of *all* critical work in plant and forest pathology. I was very pleased to see APS Press demonstrate, by publishing this work, that they recognize the value of authoritative and critical taxonomic revisions of fungal groups including plant pathogens. It is to be hoped that APS will be encouraged

to publish more basic systematic works in mycology as a result of the reception this title undoubtedly will receive.

The genera of the *Parmulariaceae*. By Carlos Antonio Inácio & Paul F. Cannon. 2008. CBS Fungal Diversity Centre, P. O. Box 85167 AD Utrecht, The Netherlands <info@cbs.knaw.nl>. Pp. 196, figs 112, tables. [CBS Biodiversity Series no. 8.] ISBN 978-90-70351-72-4. Price 40 €.

Monographic revisions of families and genera are the backbone of taxonomy, but too rarely seen today as they cannot usually be accomplished during the 3-5 year period of a PhD or research grant. That this publication represents the results of a PhD is a major achievement in itself. This primarily tropical family of foliicolous *Dothideomycetes* has experienced changing circumscriptions and never been revised in depth; indeed it has been largely neglected for the last three decades. The changing views are reflected here in a synopsis of the different treatments of genera from the late nineteenth century to date. No molecular data are available to confirm the placement of the family or of genera within it, but it is compared here with similar families, especially *Asterinaceae* from which it differs in having immersed to erumpent pulvinate and not strongly flattened ascomata with internal stromata, ascomata with the upper walls rarely of radially arranged cells, and generally lacking superficial mycelium and appressoria. Following a thorough account of the characters used in the taxonomy of the family, including those of the pycnidial anamorphs, host ranges and geographical distribution, is a key to the 34 genera accepted here; a further 24 generic names are treated as synonyms. The generic concepts adopted are traditional, and mainly based on differences in the ascomata and associated stromatic tissues together with ascospore septation and colour. This is necessary in the absence of molecular evidence, and it will be of interest to see how the concepts hold up to future molecular scrutiny.

For each genus, information on its history, typification, and differentiation is followed by full accounts of each species that is accepted, including line drawings and photomicrographs, although some of the latter sadly do not come up to the standard seen in other recent CBS publications. Two new generic names had been introduced by the authors elsewhere, *Mintera* and *Viegasella*; *Parmulariella* is included in the family; *Chaetaspis* and *Kentingia* are regarded as of uncertain position; and *Apoa* is accepted as distinct from *Pachypatella*. Twelve new combinations are made, and around 100 species are accepted in the family.

The monograph concludes with a checklist covering accepted names and synonyms, an index to host names by family, and one to binomials; an index by epithet would have been a useful adjunct.

This monograph will open up the possibilities for identifying these fungi to mycologists in the tropics, and hopefully stimulate more of them to be become interested in foliicolous ascomycetes.

Neotropical *Hypocrella* (anamorph *Aschersonia*), *Moelleriella*, and *Samuelsia*. By Priscila Chaverri, Miao Liu & Kathie T. Hodge. 2008. CBS Fungal Diversity Centre, P. O. Box 85167 AD Utrecht, The Netherlands <info@cbs.knaw.nl>. Pp. 68, figs 22, tables 3. [Studies in Mycology no. 60.] ISBN 978-90-70351-74-8. Price 40 €.

This number of the Studies includes a single paper, the full title of which is not that on the cover but the more expansive: "A monograph of the entomopathogenic genera *Hypocrella*, *Moelleriella*, and *Samuelsia* gen. nov. (*Ascomycota*, *Hypocreales*, *Clavicipitaceae*) and their aschersonia-like anamorphs in the neotropics". I guess the longer version is the one those referencing this work should cite, but this will surely occasion some confusion! This is essentially a multi-gene molecular phylogenetic and morphological study, which leads to the recognition of three genera that can all be separated on the basis of the disarticulation of the ascospores and the shape and size of the conidia. *Moelleriella* (22 species, six new, and 17 new combinations) has multiseptate ascospores that disarticulate at the septa while still inside the ascus and aschersonia-like anamorphs with fusoid conidia; *Hypocrella* s. str. (five species, two new) has filiform to long-fusiform ascospores that do not disarticulate and *Aschersonia* s. str. anamorphs with fusoid conidia; and *Samuelsia* (five species, all new) filiform to long-fusiform ascospores that do not disarticulate and aschersonia-like anamorphs but with small allantoid conidia. In addition, there are notes on five doubtful or excluded species. The species-level separations are also supported by morphological data, with stroma colour, ascospore, and conidium featuring most strongly in the keys. I was pleased to note that no independent names had been introduced for anamorphs. There is a suite of keys, both synoptic and dichotomous for each genus, with independent ones for the anamorphs. All species are described in detail and beautifully illustrated, with the habit and cultures shown in colour. Some of the colours are due to cytotoxic anthraquinones, rugulosin, and skyrin. However, it is the toxic destruxins formed that may be most important in insect pathogenicity. The study as a whole is an excellent example of how traditional and molecular data sets can come together to produce a most satisfying new taxonomy. This will surely help place work on the use of these fungi as biocontrol agents on a sounder footing than ever before. The authors now need to consider utilizing the new generic concepts in the production of a world monograph . . . .

Black fungal extremes. Edited by G. S. de Hoog & M. Grube. 2008. CBS Fungal Diversity Centre, P. O. Box 85167 AD Utrecht, The Netherlands <info@cbs.knaw.nl>. Pp. vi + 194, figs numerous, tables. [Studies in Mycology no. 61.] ISBN 978-90-70351-73-1. Price 60 €.

This issue of Studies is based mainly on a "Black Yeast" international workshop held just outside Utrecht on 26-28 April 2007, and which I was privileged to attend. It was a very special occasion in bringing together mycologists working on these fungi in quite different situations and whose paths rarely cross let alone stop and talk. The topics covered human infections, diseases of cold-blooded animals, fungi growing on rock and in lichens, application in bioremediation, occurrence in drinking water, susceptibility testing, and of course molecular systematics and evolution. Eighteen papers are included here, and it would take too much space to mention them all individually now. However, the ones likely to be of most interest to readers of Mycotaxon are concerned with: two new dothidealean genera described from rocks and lichens in the Antarctic, *Elasticomyces* and *Recurvomyces* (pp. 1-20); a reappraisal of *Aureobasidium pullulans* and its varieties (pp. 21-38); phylogenetic studies of black fungi isolated from 13 lichen species, which yielded *Cladophialophora*, *Mycosphaerella*, and *Rhinocladiella* species (pp. 83-90); the demonstration by molecular phylogenetics that the common ancestor of the mainly lichenized *Verrucariales* and the largely pathogenic *Chaetothyriales* was probably rock-inhabiting and non-lichenized (pp. 111-119); and a molecular analysis of 48 *Cladophialophora* strains leading to the description of four new species (pp. 175-191). This really shows the synergy to be gained from mycologists working on similar fungi but from different habitats collaborating, and this *Studies* thus merits attention from groups traditionally as remote as medical mycologists and lichenologists. Another fine example of the "thinking out of the box" Sybren de Hoog always does so well, and of course edited and produced to the highest standards that are now the norm for the series.

Leaf-inhabiting genera of the *Gnomoniaceae, Diaporthales*. By M. V. Sogonov, L. A. Castlebury, A. Y. Rossman, L. C. Mejia & J. F. White. 2008. CBS Fungal Diversity Centre, P. O. Box 85167 AD Utrecht, The Netherlands <info@cbs.knaw.nl>. Pp. 79, figs 48. [Studies in Mycology no. 62.] ISBN 978-90-70351-74-8. Price 40 €.

The overall systematics of this family of mainly leaf-inhabiting ascomycetes, with generally long-beaked discrete perithecia and hyaline ellipsoid to fusiform colourless and mainly 0-1 septate ascospores, has hardly been revisited since the classic monograph of Monod (1983), which accepted 22 genera and catalogued all species known in each genus. This new revision is focused around *Gnomonia* itself, and based on not only morphological but also molecular evidence derived from multiple gene analysis of 64 isolates, and ITS-only sequences from a further

322. Six genera are accepted here: *Ambarigonomia* gen. nov. (for *G. petiolarum* on *Liquidambar,* the perithecia of which have a white collar at the base of the neck), *Apiognomia* (with one new combination), *Gnomonia* (including eight new species and two new combinations), *Gnomoniopsis* (with six new combinations), *Ophiogonomia* (three new species and two new combinations), and *Plagiostoma* (one new species and four new combinations). A table (p. 10) summarizes the distinguishing characters and differences; the erumpent and collapsing perithecia of *Gnomonia* set it apart, but some of the features given as separating the other genera, particularly variations in ascospore shape and septation and appendages, did not appear so clear-cut to me. There is a key to 59 species in all, of which 22 are described and illustrated in detail. The photographs are superb, especially those showing single whole perithecia both on leaves and in culture, some "extracted and rehydrated". There are various type and epitype designations, and a synopsis of 20 genera not dealt with in the body of the work as excluded from the family, not studied, or dealt with in separate publications (e.g. *Cryptosporella*). A fine example of a systematic revision utilizing molecular, morphological, and cultural approaches.

Monod M (1983) Monographie taxonomique des *Gnomoniaceae*. Beihefte zur Sydowia 9: 1-315.

European species of *Hypocrea*. Part I. The green-spored species. By Walter M. Jaklitsch. 2009. CBS Fungal Diversity Centre, P. O. Box 85167 AD Utrecht, The Netherlands <info@cbs.knaw.nl>. Pp. 93, figs 37. [Studies in Mycology no. 63.] ISBN 978-90-70351-76-2. Price 40 €.

Having just prepared a note drawing attention to the increase in known *Trichoderma* species from nine to over 100 over the last 40 years, and then of large numbers of further novel species now being discovered in the neotropics (Hawksworth 2009), it was something of a shock when this Studies arrived. The species richness of the genus is evidently not just a tropical phenomenon, as Jaklitsch informs us that no less than 75 *Hypocrea* species have now been identified in Europe. Just the species with green ascospores are revised here, based on cultures obtained from ascospores, morphological, and multigene molecular phylogenetic analyses. Material was collected in 14 countries, with the emphasis on central Europe. Nineteen species forming green ascospores are recognized in *Hypocrea* here, of which six are described as new to science. Most are additions to already known clades, but three — *H. spinulosa* and two new species — represent a new clade altogether. The information presented on both the sexual and asexual states of the individual species is impressively detailed, as is the investigation of the nomenclature and typifications. The species are illustrated in colour, and I was very pleased to see that these often had a range of stromata from different collections of the same species, as well as photographs

of cultures on several media. In what may at first seem contrary to Rec. 59A.3 of the Code, five new formal binomials in *Trichoderma* are introduced for the anamorphs where new *Hypocrea* species are being described or where they did not exist. I say "at first" because the author indicates that the additional names in *Trichoderma* are established "in order to provide combinations in *Trichoderma* for a possible scenario in the future that may demand the use of *Trichoderma* for the holomorph" (p. 4). He is evidently against the one-name-one-species move, considering that it would disrupt existing concepts, cause chaos, and contribute to the disrepute of taxonomists — opinions I and many other mycologists do not share. Wisely, for the newly described species, he commendably uses the same epithets for both states. However, if the prospective changes in the rules enable *Trichoderma* to be used for the whole fungus, the epithets in *Trichoderma* names could well still need to be epitypified by material with ascospores – but this issue is still far from settled. These nomenclatural quibbles should in no way detract from the excellent scientific quality of this study, which, with the eventual Part II, will provide a sound basis for the identification of these fungi in Europe. Yet I doubt that this will be the last word on the matter. The new collections were mainly from central Europe, and especially Austria as "most European climatic zones are represented in this country" (p. 14), but that area does not contain examples of either Atlantic oceanic habitats or the most severe Mediterranean climates. I suspect there are even more new species to be found in Europe as there seem to be geographical or climatic differences. The author notes, for example, that one rare species not in the green-spored group, *H. tremelloides,* was collected five times within eight days in various parts of England . . . .

Hawksworth DL (2009) A plethora of undescribed neotropical *Trichoderma* species. Mycological Research 113: 1337.

Biodiversity of the powdery mildew fungi (*Erysiphales*, *Ascomycota*) of Israel. By Svitlana O. Voytyuk, Vasyl P. Heluta, Solomon P, Wasser & Eviatar Nevo. 2008. A. R. G. Ganter Verlag, FL-9491 Ruggell [Distributed by Koeltz Scientific Books, Herrnwaldstrasse 6, D-61462 Königstein, Germany <koeltz@t-online.de>]. Pp. ix + 290, figs 120, tables 5. [Biodiversity of Cyanobacteria, Algae and Fungi of Israel no. 7.] ISBN 978-3-906166-74-2. Price 89 €.

This study is based on material collected since 2002, specimens in collections, and literature reports. The book is divided into five chapters. The first four address: the main features of Israel; materials and methods; life-cycles, morphology and the taxonomic system (with fine SEMs of conidium surfaces); and the status of the order in Israel. This last chapter, in addition to analyzing by hosts and geographical elements, includes a "mycoflorogenetical analysis" somewhat speculatively discussing migration routes into the country. More surprising to me was to find embedded in such a book a 13-page phylogenetic

study of 18 *Leveillula* species based on ITS and tubulin gene sequences; the results were compared with SEM features of the conidia, in some cases substantiating differences. That study surely merited wider exposure through publication in an established journal than it will ever receive from being within these covers. These chapters fill 86 pages, and the remainder of the volume is devoted to the powdery mildews recorded from Israel, in total 64 species dispersed through eight genera. There are keys to genera and species, and for each species details of places of publication of accepted names and synonyms, full descriptions, information on hosts and distribution (mostly with maps) and photomicrographs, sometimes accompanied by line drawings or SEM micrographs. I found the detail of the information given on all records somewhat daunting as for some species it occupies several pages and wondered it that might have been better just summarized or at least placed in small type. The volume concludes with separate host and fungus indexes. It is pleasing to see this somewhat eclectic series continuing, as it is of regional and not only national relevance as there are so few works for the identification of fungal groups in the neighbouring countries.

Atlas of the geographical distribution of fungi in Poland. Fasc. 4. *Laboulbeniales*. By Tomasz Majewski. 2008. W. Szafer Institute of Botany, Polish Academy of Sciences, Lubicz 46, PL-31-512 Kraków, Poland <ed-office@ib-pan.krakow.pl>. Pp. 240, maps. ISBN 978-83-89648-55-6. Price 45 €.

The last fascicle in this series appeared in 2005 (see Mycotaxon 96: 335, 2006) and was devoted to something of a *potpourri* of macromycetes. This one is different, in that it is devoted to a single order, and prepared by one of the world's foremost specialists on *Laboulbeniomycetes*. It is also different in that it has introductory sections on the overall systematics of the order, and the collection (something I have personally found extremely difficult!) and preservation of these fungi. The treatment of the species has also been changed, and data are included on places of publication, sources of descriptions and illustrations, hosts, and distribution and ecology in Poland. Locality and collection details are given as before, but the maps have been reduced to about one third the height of a single column rather than being full-page. Somewhat unusually, but reflecting our poor state of knowledge of these fascinating fungi, is a list of eight as-yet undescribed species and their localities. In total, 206 species are treated. Notes on three erroneously reported species are also provided, and there are separate indexes to the scientific names of the "animals" and the fungi. This work is much more than an Atlas! It is intended as a "comprehensive review" (p. 5) of the order in Poland based on over 10 000 collections made by the author and his numerous publications, which include a 1994 monograph. It is published now "as this cycle of activity is coming to an end" (p. 5), which

I trust may not prove to be entirely true as Tomasz is only 69 years old, and his beautiful drawings and meticulous taxonomic treatments would be sorely missed by all concerned with these weird and fascinating fungi.

***Aspergillus*: molecular biology and genomics.** Edited by Masayuki Machida & Katsuya Gomi. 2010. Caister Academic Press, Rowan House, 28 Queens Road, Hethersett, Norwich NR9 3DB, UK (www.caister.com). Pp. x + 238, numerous figs. ISBN 978-1-904455-53-0. Price £ 159, US $ 310.

This book, to be released on 1 January 2010, provides a wide overview of the forefront of *Aspergillus* genomics from bioinformatics and systems biology to gene regulation, secondary metabolism, and novel industrial applications. It comprises ten chapters involving 29 authors from eight countries, with Japan and the USA predominant. The focus is very much basic genomics and no chapter is focussed on medical aspects such as aspergillosis. This work is mentioned here, as while not primarily systematic, two chapters will be of particular interest to fungal systematists. First, Joan W. Bennett's pragmatic and perceptive overview of the history and nomenclature of the genus, in which she is critical of jargon and points out that "sometimes nomenclatural decisions go against common sense" (p. 6). Second, Robert W. Samson and János Varga's synopsis of the present state of systematics in the genus, with summaries of the currently accepted eight subgenera and various sections – and the 13 teleomorph "genera" linked to the different subgenera and sections. These two chapters merit careful reading and reflection by those mycologists currently debating how the current rules for the nomenclature of pleomorphic fungi should best be modified to achieve the goal of one-name-one-fungus. Sadly, the high price may preclude these and other contributions securing the wider readership they merit.

***Alternaria:* an identification manual**. By Emory G. Simmons. 2007. CBS Fungal Diversity Centre, P.O. Box 85167 AD Utrecht, The Netherlands <info@cbs.knaw.nl>. Pp. iv + 775, figs 288. [CBS Fungal Diversity Series No. 6.] ISBN 978-90-70351-68-7. Price 170 €.

The ubiquitous pleosporaceous anamorph genus *Alternaria* (teleomorph *Lewia*) includes several notorious host-specific plant pathogens and numerous saprotrophs. Members of the genus are frequently isolated from soil and plant debris, or as spoilage agents from food. They are also often reported as endophytes of plants, as (opportunistic) pathogens of mammals, and among the highly allergenic mycobiota in damp indoor spaces. Numerous secondary metabolites with pronounced bioactivities are known from *Alternaria* species, including host-specific phytotoxins, as well as hazardous mycotoxins and selective antibiotics.

Despite the ubiquitous occurrence of *Alternaria* species and their undisputable practical importance, no concise and complete monograph on the genus had been published to date. Non-taxonomists often relied on rather broad species concepts in which saprotrophic and plant pathogenic fungi were treated under the same aggregate names and founded on gross morphological similarities. Evidently, such a classification does not adequately reflect the biology of these fungi. Alternatively, concise species concepts are needed to satisfy the needs of plant pathologists, building mycologists, bioprospectors, ecologists, and biodiversity researchers who work with unambiguous data.

Fortunately, a valuable alternative has now become available, due to the efforts of Emory G. Simmons, who has been focusing on *Alternaria* and allies for more than five decades. His series "*Alternaria* themes and variations", comprising over 300 articles in Mycotaxon, should certainly be well known to the readership of the journal. His meticulous studies and his pragmatic morphological species concepts have already helped to resolve some complicated species complexes, to recognize certain anamorph-teleomorph relationships, and to segregate some aberrant forms from the mainstream of the genus *Alternaria*, now transferred to different genera. Various plant-associated taxa formerly regarded as "special forms" or "host-specific varieties" can meanwhile be recognized as good species.

The Manual not only summarizes the state of the art of the above-mentioned studies but attempts to provide a means of sound morphological identification of all currently accepted *Alternaria* taxa for the first time. Nevertheless, it is not intended to be a monograph. As the author states, his effort to provide a complete monographic work was "interrupted" by the work on the current Manual. However, the wealth of information contained in this monumental work makes me wonder whether this is not just a mere understatement.

The bulk of the Manual is dedicated to meticulous descriptions and line drawings of 276 accepted, well-circumscribed species (at least two pages deal with each of these taxa). In the illustrated part, special emphasis is given to micromorphological characters of the cultures grown under standard conditions and to the characteristics of the available type specimens. Twenty additional species that need further study are treated less extensively.

These detailed morphological treatments are preceded by a relatively short but complete summary of the taxonomic and nomenclatural history of *Alternaria*, comments on previous and alternative species concepts, and descriptions of methods for cultivation and morphological studies. For other aspects that do not deal with identification and morphology, the reader is referred to a rather comprehensive list of references. The segregation of *Alternaria* from morphologically somewhat similar genera (e.g. *Embellisia* and *Ulocladium*) is also addressed before the above-mentioned species are keyed

out. Eleven species groups in *Alternaria* are distinguished, based mainly on sporulation patterns and conidial morphology. Concise illustrations and useful general comments in the preambles greatly facilitate usage of the keys.

The Manual includes no fewer than 70 new species descriptions and 18 new combinations. In addition, three new generic names (*Alternariaster, Chalastospora,* and *Teretispora*) are introduced for species formerly placed in *Alternaria* that show significant deviations from the mainstream of species still included.

Those who are interested in taxonomic history and nomenclature will find a comprehensive list of over 1100 names associated with *Alternaria* through the past 200 years, including comments on their current status and references to their typification. These data are particularly valuable because they come from the only person who has actually seen all the relevant extant material. Notably, many of these names are based on herbarium specimens, while the presented species concepts rather rely on characteristics observable in culture. Hence, only the latter species are keyed out and illustrated in detail to avoid inconsistencies.

Based on some *Alternaria* strains from our culture collection, I have tested these keys with my students. We found it easy to recognize the proposed sporulation patterns, while species identification still appeared rather difficult, probably due to our lack of experience. Sometimes the dichotomous keys presented are apparently not sufficient, confirming a pertinent remark in the introductory section that multiple characters need to be observed in concert, in order to allow for a precise identification. It occurred to me that synoptic keys might be adequate, e.g. for differentiation of all the small-spored taxa, which are very tricky to discriminate. Such synoptic identification systems, however, could probably be realized more easily on a computer-based platform than in a printed medium.

In conclusion, the Manual serves its purpose very well; albeit some familiarity with the genus is helpful. When in doubt it might be advisable to study authoritatively named reference cultures for comparison.

Without doubt, this book will be of great utility both in basic and applied mycology. In my opinion it proves convincingly that careful morphological studies will always remain indispensable, no matter which alternative methodology will be employed or developed in the future. At present, the utility of molecular phylogenetic methods for segregation of *Alternaria* appears to be limited. At least the discriminatory potential of (ITS) nrDNA sequence data does not apparently reflect the morphological and biological diversity in *Alternaria* as described in the Manual, as judged from the data available as now. However, other mycologists have faced similar problems during their work on other groups of filamentous ascomycetes. Realizing that rDNA sequence

data have limited utility, they finally succeeded in their phylogeny becoming congruent with morphological hypotheses by using different genes or even multi-gene genealogies, or by taking non-morphological phenotype-based evidence into account. The present status of *Alternaria* morphotaxonomy really cries for additional, polyphasic studies.

This Manual will also open new avenues for verification of the morphological concepts by means of complementary methodology, involving non-morphological studies of the phenotypes and genotypes. Numerous representative strains that have been meticulously studied by the author are already available in public genetic resource collections. This provides an ideal prerequisite for follow-up work using complementary techniques. Indeed, such studies have already been undertaken in the past years, demonstrating that certain practically important features, including secondary metabolite production, are largely in agreement with the morphological concepts proposed in the Manual.

I could only imagine that chemotaxonomic and molecular phylogenetic studies on *Alternaria* will eventually not only reinforce but perhaps even refine these concepts. The Manual, in any case, constitutes a masterpiece of what might be termed "morpholomics". I can only highly recommend it to all mycologists who are involved in the study or identification of conidial fungi. I sincerely hope the author will continue to actively pursue his monographic work for many years, and that many younger mycologists will be keen to follow his example.

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Lichen-forming and lichenicolous fungi

Pyrenocarpous lichens with bitunicate asci: A first assessment of the lichen biodiversity inventory in Costa Rica. By André Aptroot, Robert Lücking, Harrie J. M Sipman, Loengrin Umaña & José Luis Chaves. 2008. J. Cramer in der Gebrüder Borntraeger Verlagsbuchhandlung, D-14129 Berlin, Germany <mail@schweizerbart.de>. Pp. 162, figs 32, tables 3. [Bibliotheca Lichenologica no. 97.] ISBN 978-3-443-58076-6. Price 68 €.

Crustose lichens occurring on bark in the tropics, other than graphids and thelotremes, are one of the outstanding major challenges for lichenologists today. Huge numbers of taxa have been described, especially in the mid-nineteenth and early twentieth centuries, and often in large genera with many hundreds of names that have not been critically assessed according to current generic, let alone species, concepts. This brave attempt to tackle this problem for Costa Rica accepts 181 species distributed through 32 genera. One new family

(*Celotheliaceae*) and 15 new species are described, and 13 new combinations made. Particularly valuable have been revisions of type material that have led to the synonymization of 20 names, mostly coined by Müller Argoviensis or Dodge, with previously described species. Keys are provided to genera and species, arranged with a set of six sub-keys pragmatically based on ascospore colour and septation. The species entries are presented in a single alphabetical sequence, without places of publication of the names themselves, but with brief descriptions, information on their distribution, a list of specimens examined, and in some cases notes or half-tone habit photographs or photomicrographs of the spores. The inventory is surely far from complete, but it is based on an impressive 1735 collections made from 34 sites, mainly in 2002-2004, as well as historic collections. Unusual for a primarily systematic study is a multivariate analysis of the sites, which distinguished six categories from lowland deciduous dry forest to the upper montane rain forest. This analysis also highlighted some indicator species of the different forest types. While not all lichenologists might concur with some parts of the classification and generic concepts adopted, there can be no doubt that this work will serve as THE starting point for the identification of pyrenocarpous lichens in the neotropics.

Hongos liquenícolas del Sur de Sudamérica, especialmente de Isla Navarino (Chile). By Javier Etayo & Leopoldo García Sancho. 2008. J. Cramer in der Gebrüder Borntraeger Verlagsbuchhandlung, D-14129 Berlin, Germany <mail@schweizerbart.de>. Pp. 302, figs 132, incl. 2 maps. [Bibliotheca Lichenologica no. 98.] ISBN 978-3-443-58077-3. Price 74 €.

South America is still relatively unexplored for lichens and lichenicolous fungi. It has become in recent years more and more attractive to lichenologists desiring to discover new species, explore the biodiversity of species in still well preserved areas of our natural heritage, or study climate change using lichens to elucidate what is happening in the Southern Hemisphere. This is especially true for European lichenologists who are saturated with well-explored European areas. Lichenicolous fungi are highly under-collected in this continent. The potential richness of lichenicolous fungi in South America is very high, and many new species and genera could be expected to be described in future. The current number of described lichenicolous fungi in the world is about 1700 species, but based on the rapidly increasing number described over recent decades, we can easy expect 3000 species to be reached in the near future. Therefore, it is not surprising that the lichenicolous fungi of this largely unexplored continent attracted Spanish lichenologist Javier Etayo. With every one of Etayo's publications on lichenicolous fungi from South America, he substantially increases the number of known species in the world. In his monograph on lichenicolous fungi of Colombia (Bibliotheca Lichenologica 84: 1-154,

2002; see Mycotaxon 87: 500-501, 2003), he described 52 species of the 104 species identified (every second one was new for science!) and even noted that 47 further taxa could not be described because of insufficient material or being in poor condition. It is not surprising that the current monograph published with co-author Leopoldo García Sancho on lichenicolous fungi mainly from Chile increases the number of new taxa known from South America even further. All specialists studying lichenicolous fungi will want to have this new book with such a comprehensive amount of information in his or her bookcase as much as they wanted to have his former book.

An international group of lichenologists from Spain and Denmark undertook two expeditions (in 2005 and 2008) to southern Chile and Argentina. They explored 60 localities, most of them in the Isla Navarino in the Beagle Channel. The present study of lichenicolous fungi is based on 696 samples representing 240 species, of which 189 are published in this book and of which six genera and 60 species are described as a new to science. Still, a further 51 species remain as undescribed!

In 1999, Galloway & Quilhot (Gayana Botanica 55: 111-185, 1999 ["1998"]) published a checklist of Chilean lichen-forming and lichenicolous fungi in which they reported only 32 lichenicolous fungi, based mainly on the collections of Spegazzini, Dodge, and Wedin.

The new species are described in detail and are well documented by 123 (of 132) excellent drawings and photographs, which we have come to expect as typical for Etayo. The introductory chapters are well written, and introduce the abiotic factors that influence the area as well as biotic factors (mainly vegetation types). Separate chapters discuss the hosts, co-evolution, and host specificity of lichenicolous fungi. A short note promises that a full account of the lichen biota of the study area will be published too.

Six new genera are described: *Atronectria,* similar to *Pronectria* but with brown, K+ blackish green ascomata; *Macrographa,* with large ascomata and three septate spores of unknown affinities; *Pseudostigmidium,* related to *Stigmidium*, but generally with an I+ red hymenium and 3-septate spores, with five species living on *Pseudocyphellaria* and *Nephroma*; *Sarcoexcipula,* with a thick and complex perithecial wall and large and septate ascospores; *Umbilithecium,* an *Arthonia*-like genus but with a different hymenial structure and simples spores; and *Umushamyces,* similar in habit to *Arthonia,* but with *Biatora*- or *Bacidia*-type asci.

Sixty new species are described in *Arthonia, Atronectria, Bachmanniomyces, Capronia, Carbonea, Chalara, Corticifraga, Corticiruptor, Dactylospora, Diederimyces, Endococcus, Leptosphaeria, Lichenochora, Lichenopeltella, Macrographa, Merismatium, Microsphaeropsis*, *Minutoexcipula, Muellerella, Nanostictis, Nectriopsis, Neobarya, Niesslia, Odontotrema, Phaeosporobolus,*

Phoma, Plectocarpon, Polycoccum, Pronectria, Protothelenella, Pseudostigmidium, Rhagadostoma, Sarcoexcipula, Sclerococcum, Scoliciosporum, Skyttea, Sphaerellothecium, Stigmidium, Taeniolella, Toninia, Trichonectria, Umbilithecium, Umushamyces, Unguiculariopsis, and *Xenonectriella*. In addition seven new combinations are made and two new synonymies proposed, including placing the generic name *Kalaallia* as a new synonym of *Opegrapha*.

A key to species is provided for several genera covering species occurring in the study area: *Capronia, Corticifraga, Dactylospora, Endococcus, Nanostictis, Neobarya, Niesslia, Phaeosporobolus, Phoma, Pronectria,* and *Pseudostigmidium*. Unfortunately, overall keys to genera treated and the large genus *Arthonia* are not provided. An alphabetical list of lichen hosts and their fungi concludes the work, together with extensive literature citations, which will be much appreciated. *Pseudocyphellaria* and *Nephroma antarcticum* emerge as hosts that support really surprising numbers of lichenicolous fungi!

Etayo's work deserves the highest evaluation. Lichenologists working in the Southern Hemisphere in particular will find this book very important for their own future studies of lichenicolous fungi. I am sure this work will encourage the interest of many new lichenologists and students in the discovery of as yet hidden additional lichenicolous fungi.

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Biodiversity and ecology of lichens: Liber amicorum Harrie Sipman. Edited by André Aptroot, Mark R. D. Seaward & Laurens B. Sparrius. 2009. J. Cramer in der Gebrüder Borntraeger Verlagsbuchhandlung, D-14129 Berlin, Germany <mail@schweizerbart.de>. Pp. 439, figs 117, tables 12. [Bibliotheca Lichenologica no. 99.] ISBN 978-3-443-58078-0. Price 89 €.

This volume is designed to pay tribute to Harrie Sipman, ever the Dutchman, who has spent his entire postgraduate career as lichenologist at the Botanical Garden and Museum in Berlin, as he enters his final year to retirement. The collection comprises 26 papers, plus an account of his professional life and lists of his publications and new taxa he introduced. They have been prepared by his colleagues, and nine contributions are by or co-authored with André Aptroot. The main focus of Harrie's work has been the tropics, and photographs of him in the field in Brazil, Guyana, and New Guinea are included. The volume consequently has a strong tropical focus, in which the papers on the Biogradska Gora National Park in Montenegro and two new *Cladonia* species from Iceland, for example, seem rather out of place. New taxa are described from Australia (in *Caloplaca* and *Xanthoparmelia*), Brazil (in *Chapsa*), the Canary Islands (in *Bacidia*), Korea (six pyrenocarpous species), Namibia (in *Buellia*), Thailand (in

Cryptothecia and *Stirtonia*), and the West Indies (in *Micarea*). There is also a checklist of lichens from the Seychelles group, and a catalogue of the liverworts and hornworts (yes, not the lichens) of the Galapagos Island (by Robbert Gradstein, one of Harrie's early mentors). However, of the widest interest here are the revisionary papers, the longest of which, at 48 pages, is on the re-instatement of *Herpothallon* as distinct from *Cryptothecia,* with 29 species now accepted in *Herpothallon,* of which 17 are newly described and 13 combined into it; but I do wonder whether conservation of *Cryptothecia* with a different type might have been a preferred option in the interest of nomenclatural stability, as some of these lichens are so conspicuous and well-known. There is also a synopsis *Placopyrenium,* which accepts 14 species (three newly described), a key to the known species of the lichenicolous genus *Sphaerellothecium* (19 species, one newly described), the resurrection of *Trypetheliopsis* (six species, five newly combined), which proves to be an earlier name for *Musaespora* described in 1993, a new genus of *Arthoniaceae* (*Synarthothelium*) for two new species from Costa Rica and Venezuela), molecular phylogenetic studies to determine the positions of *Schistophoron* and *Tylophoron*, and a new worldwide key to cryptothalline species of *Lecidea* (ones forming endolithic thalli and accompanied by fine coloured photomicrographs of apothecial sections). Of especial interest to those fascinated by the evolutionary history of lichens is a critical examination of the evolution of cyanobacterial symbioses based on molecular sequence data; it is concluded that these mutualisms evolved repeatedly, and that now seems clear for *Lecanoromycetes*, but with *Lichinomycetes* still basal to the *Lecanoromycetes* (albeit with ambiguous support), this may not be the last word on this topic!

This is a Festschrift that all working with tropical crustose lichens in particular will wish to have on their shelves. I am sure Harrie will enjoy it and reflect how far knowledge on these lichens has progressed since his monograph of the mainly tropical *Megalosporaceae* was published as no. 18 in Bibliotheca Lichenologica back in 1983. I am sure all lichenologists will wish him a fulfilling and productive "retirement."

Diversity of lichenology – anniversary volume. Edited by Arne Thell, Mark R. D. Seaward & Tassilo Feurer. 2009. J. Cramer in der Gebrüder Borntraeger Verlagsbuchhandlung, D-14129 Berlin, Germany <mail@schweizerbart.de>. Pp. 512, figs (some colour), tables. [Bibliotheca Lichenologica no. 100.] ISBN 978-3-443-58079-7. Price 124 €.

This volume is published to celebrate a major achievement in the history of lichenological publication – Bibliotheca Lichenologica reaching its 100th volume, 36 years after the series was initiated by Jörg Cramer in 1973 with Josef Poelt as its' advisor. It soon became, and has continued to be, the place for the publication of monographs, symposia, and Festschrifts on

lichens and lichenicolous fungi, and has been under the overall editorship of Volkmar Wirth since 1983. This volume starts with a history of the series and list of the works so far included and then continues with 17 further chapters; these are contributed by 37 authors from 13 countries and are all in English, reflecting the international status the series has evolved into from its Austro-German dominated early years. Hidden amongst these is an 85-page article on "Fifty influential lichenologists" compiled by Ingvar Kärnefelt, which has brief biographies with photographs of the 50 persons selected. Ingvar makes clear this is "very much the author's personal choice." The selection must have been difficult, and while I was personally gratified and humbled to find myself included, I was surprised not to find, amongst others, Ken Kershaw, William Lauder Lindsay (1829-1880), David Richardson, David Smith, Vittore Trevisan (1818-1897), or Wilhelm Zopf (1846-1909) – all of whom have done so much in laying the foundations of aspects of modern lichenology. I shall not suggest which persons might have been dropped in their stead . . ..

It is not clear to me how the topics and authors of the other contributions were selected, but they certainly live up to the title of the volume in the range of subjects involved. Most have a systematic bent, and all cannot be mentioned here. However, the most far-reaching of these has to be the molecular phylogenetic study of xanthorioid lichens by Natalya Fedorenko and colleagues in which three further new genera are recognized to add to the three others also introduced in recent years: *Jackelixia, Ovealmbornia,* and *Xanthokarrooa.* There is also a major study (73 pp.) of the *Teloschistaceae* in the Southern Hemisphere by Sergij Kondratyuk and others that includes the description of 35 new species, mainly in *Caloplaca,* with many illustrated in colour. Also sure to be widely used are the keys (both dichotomous and synoptic) to the 32 European species of *Usnea* by Tiina Randlane and her group in Tartu, which has the best macro-photographs (many in colour) of diagnostic details in the genus I have seen in print and further distribution maps and discussions of individual species. Topics of other systematic papers include ones on *Phacothecium* (resurrected for *Opegrapha physciaria*), *Polysporina, Thelocarpaceae* and *Vezdaeaceae* (to be excluded from *Lecanoromycetes*), and *Traponora* (with four new species added).

The issue of how many tropical lichens there might be on Earth is tackled by Robert Lücking and colleagues in the light of intensive studies in Costa Rica. Based on species-area relationships and ecosystem diversity, they come up with 7,000 for the neotropics, 14,000 for the entire tropics, and 28,000 worldwide – a much higher world figure than previous global estimates. There are also contributions on ecology from the Namibian desert to the Baltic coast, growth-rates of 22 epilithic species in Iceland, the formation of lichen substances by cultured mycobionts, etc. It would have been great also to have more

ecophysiology and biont-interaction biology included as these are increasingly fascinating areas of modern lichenology, but I can appreciate that the authors' could have had problems in securing such papers for this publication.

In reflecting on the success and special place this series has assumed in lichenology, surely the time has come when it should be included in the Thompson Reuters ISI Journal Citation Reports and assigned an Impact Factor. This is especially so as some very comparable works of a similarly sporadic and largely monographic or symposial nature are already included, not least Studies in Mycology, which has the highest IF in the whole of the mycology group of journals at 4.625 in 2008 — even ahead of the prestigious Fungal Biology and Genetics which has 3.005! In any case, all serious lichenological libraries should maintain a standing order for the series and, if possible, secure any back issues they are missing.

Foliicolous lichenized fungi. By Robert Lücking. 2008. The New York Botanical Garden Press, 200th Street and Kazimiroff Boulevard, Bronx, NY 10458-5126, USA <nybgpress@nybg.org>. Pp. 867, figs 258. [Flora Neotropica Monograph no. 103.] ISBN10: 0-89327-491-7; 13: 978-0-89327-491-7. Price US$ 125.

[Winner of the Société de Physique et d'Histoire Naturelle de Genève (SPHN) 2008 Augustin-Pyramus de Candolle Prize for the best monograph.]

It is a great book: large in size, content, degree, very important, and very good. All meanings of the word "great" apply to it. We waited for it for a long time and also expected a lot from all the sentences what were written in it. Our expectations were mostly due to the subject having been studied by a few lichenologists only — one last summarised by Santesson (1952) in his worldwide monograph – and also due to Robert Lücking's record as the world's most outstanding researcher of the foliicolous lichens today. He is also an outstanding representative of systematists of lichenized fungi, especially for studying crustose taxa in the tropics. His deep interest in these fields is reflected in his approaching the subject in this monograph from various aspects – from history to use, via morphology, anatomy, chemistry, phylogeny, biogeography, ecology, and classification. As a result, we now have a relatively holistic view of the lichens inhabiting this very special substrate: the leaf surface. Almost 900 literature sources were taken into consideration in producing this synthesis.

The term "foliicolous lichens" is reserved for lichenized fungi growing obligately (or more seldom facultatively) on the laminal photosynthetic organs, primarily of angiosperms but some also occur on those of gymnosperms, pteridophytes, and bryophytes. Most colonise the upper surface (epiphyllous taxa), others the lower surface (hypophyllous ones), and some produce fruit bodies at leaf edges. Their distributional area, with a few exceptions, is tropical.

Foliicolous species belong to various higher taxonomic units of lichenized fungi, and systematically are very diverse. Of the more than 800 species so far described, 616 are found in the Neotropics. These are treated here in a systematic order, but an alphabetical index of scientific names of taxa is added. A large proportion of the species known in the world today are included in the artificial keys, and further natural keys to higher taxonomic units are provided. Although not all species known worldwide are included in the keys, material outside the Neotropics is considered when characterising their ecology and distribution. Furthermore, descriptions of orders, families, and genera are based on all members of the group, even including non-foliicolous representatives. The number of infraspecific taxa used and newly described in the monograph is relatively high compared to the usual number in recent treatments. However, one must agree with the author – who regards them as a temporary position for these particular taxa – that more information is required to justify the real taxonomic rank of many. There are an enormous number of taxonomic novelties published in the volume, including new taxa, combinations, and synonymies. There is a numerical list of taxa (pp. 819–829) amongst which are the new family *Lyrommataceae* and four new genera, *Baflavia, Brasilicia*, *Eugeniella,* and *Phyllogyalidea.* The first three of these genera originate from the former *Bacidia* s. lat., while *Phyllogyalidea* is separated from *Gyalidea* s. lat. A new section, *Badimia* sect. *Pseudogyalecta,* is also established. No fewer than 60 new species and 13 new infraspecific taxa are also described here for the first time, and 35 new combinations are also made – and not all for taxa which occur in the neotropics. The name *Strigula tremens* is also reintroduced, and ten new taxonomic synonymies established amongst which are three recently described names.

As the new taxa are deposited in several herbaria (including private herbaria) of the world, it would have been convenient to have a list of these (perhaps with information as to their accessibility) in the chapter on Materials.

A review would not be complete without mentioning some details that could have been improved. It was difficult to find any such matters in this case, but perhaps it is worth mentioning that coloured photographs would have been highly appreciated by lichenologists instead of only half-tone black and whites. Foliicolous lichens, as many other lichens, are very colourful, and although half-tones show their great diversity of form, the diversity represented in their colours is missing. This is particularly so as colours can contribute to the successful identification of species. The drawings have been executed with great care, but unfortunately are not all are in the same style. In particular, some of the sketches look very different from others (e.g. spore illustrations) – most probably because the lines are thicker on the sketches (e.g. Figs 26 and 29) than on the other figures. A great advantage for comparisons is that the scale for

figures is the same (12.5 mm = 10 μm); however, one is missing from Fig. 86 but can be expected to be the same 12.5 mm for the 100 μm indicated in the legend. The position of letterings indicating spores could also be improved in some places (e.g. Fig. 204). Of course, these are minor things – compared to the extraordinary work achieved in the whole monograph – and could be corrected in another impression or edition.

Lücking's monograph is a monumental work, a huge contribution to our general knowledge on foliicolous lichenized fungi, and also an incredible contribution to our knowledge of world biodiversity. It is indispensable and unavoidable for all who endeavour to carry out research on foliicolous lichens, or to use them as bioindicators in tropical areas generally, and not just in the neotropics. Foliicolous lichens of the palaeotropics are much less known, even if their knowledge is also increasing. Still, most probably we must wait for another generation to achieve a similar compilation of those areas, as well as for a new world monograph to replace Santesson's.

Santesson, R. 1952: Foliicolous lichens I. – Symbolae Botanicae Upsaliensis 12(1): 1–590.

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The lichens of Great Britain and Ireland. Edited by Clifford W. Smith, Andre Aptroot, Brian J. Coppins, Anthony Fletcher, Oliver L. Gilbert, Peter W. James & Patricia A. Wolseley. 2009. The British Lichen Society, c/o Department of Botany, The Natural History Museum, Cromwell Road, London SW7 5BD, UK. Pp. x + 1046, figs 50, tables 1. ISBN 978-0-9540418-8-5. Price £ 65.

Seventeen years after the first, the second enlarged edition of The lichen flora of Great Britain and Ireland (Purvis et al. 1992) arrived, with a reduced price to British Lichen Society (BLS) members (£ 45). Taking into account that there are only a few modern lichen floras in the world, this will probably become as indispensable as the first edition was, but not only for British or Irish people and students interested in lichens, but for lichenologists more generally. For those who have used the first edition, the second edition volume is over 336 pages longer, with a similar structure and organization of the keys and descriptive parts. However, the Glossary is now located before the generic keys instead of before the references, which takes some practice to become familiar. It deals with 1873 species in 327 genera, adding 72 genera and 386 species to the first edition, and summarizes the effort of several generations of national and foreign lichen taxonomists and amateurs on the Islands. Numbers alone tell the story. New numbers (e. g. new lichen records each semester to the flora; Hitch 2009) add potential for an expectation of the flora's continuation, in spite

of the documented decline of lichen taxonomy and taxonomists generally in the UK (Fletcher 2008). The book, produced with a nice-looking hardcover (renouncing the former characteristic stout red binding), is particularly easy to use even with its larger volume and weight, and friendlier than similar recent lichen floras from different territories in several volumes (e. g. Galloway 2007; see Mycotaxon 197: 518-520, 2009), but contrary to Galloway's flora, it lacks a free electronic online version. In being rejuvenated, authors of the generic accounts are cited below the genus name at the start of each generic account, and selected literature and illustrations are cited for most. However, it could be more useful to put generic names in the upper right corner of the page rather than the left. Nevertheless, the work definitively maintains the tradition of being as well done and accessible as its predecessor.

Following the multi-authored approach of the first edition, there were contributions from 52 specialists, including 24 overseas lichenologists. After the roman numbered pages including a foreword, acknowledgements, lists of contributors, figures and tables, page one starts with a brief introduction: tips on the use of the monograph, techniques used, and its organization. Next is a systematic arrangement of the accepted genera in the book which closely follows the current "Outline of *Ascomycota* – 2007" (Lumbsch & Huhndorf 2007), but for lichenized *Basidiomycota* the genus *Lichenomphalia* is included in *Agaricales* as *incertae sedis,* instead of in *Hygrophoraceae* as accepted by Kirk et al. (2008). The glossary includes additions and deletions of fungal terminology to the first edition, avoiding technical vocabulary where possible as a concession to non-specialized users, but the reader must be careful as some words are out of alphabetic order, some terms are missing (e. g. cuticle, gills, flesh, used in the account of *Lichenomphalia*, pp. 553-556), and there are overly concise explanations of some words. The generic keys, as the species keys, are dichotomous and well constructed, including easily obtained traditional morphological, chemical and ecological characters. Especially noteworthy is the inclusion of a new artificial key to sterile crustose saxicolous and terricolous lichens (pp. 96-122) that was lacking in the first edition. Surprisingly, there are some contradictions in that key (i.e. Generic key 8) as well in some keys to species and also in the treatments of genera. Using again *Lichenomphalia* as example, in the crustose generic key 8, couplet 17 (p. 98), the sterile bulbiliferous thallus (*Botrydina*-type) of *L. umbellifera* and *L. velutina* are included together because of the absence of other characters that differentiate the species unmistakably, as pointed out by Barrasa & Rico (2001). Contrarily, in the *Lichenomphalia* species key (p. 554), the authors, employ thallus characters such as wall diameter and thickening of the subtending hyphae amongst the bulbils to separate sterile specimens of both species and also *L. alpina*.

In the body of the work, 954 pages treat the genera and species in sequence (except in *Cladonia*). The treatments are mainly based on the first edition, but with additional generic authors added to the byline, newly incorporated genera and species are to be expected. Hard revision has been undertaken, with special care taken with critical taxonomic groups. A new generic segregation in *Parmeliaceae* is adopted following Hawksworth et al. (2008). Thanks to the editors (particularly "Tony" Fletcher and Brian Coppins), most of the genera not treated critically and fully in detail in the first edition are now intensively revised and more comprehensive (e.g. *Aspicilia*, *Caloplaca*, *Lecania*, *Lecanora*, *Lecidea*; but see the interesting and critical review by Fletcher 1994). The main work finishes with two added species in an appendix, 42 pages of references in alphabetic sequence, and an index with the epithets of the mentioned taxa. There are 49 line drawings, five more than in the first edition; these improve the flora and illustrate the glossary and critical characters in the case of difficult species in various genera, but some are poorly scanned or copied.

However, the inevitably commented on small things do not detract from the main achievement of this book, a landmark comprehensive updating compilation for the identification of lichens, not only from Britain and Ireland, but from temperate and oceanic areas in Europe. The book definitely enhances the reputation of the BLS and of the contributors. I use my copy almost every day.

Barrasa JM & Rico VJ (2001) Lichenized species of *Omphalina* (*Tricholomataceae*) in the Iberian Peninsula. Lichenologist 33: 371-386.

Fletcher A (1994) Book Reviews: The lichen flora of Great Britain and Ireland. Edited by O.W. Purvis, B.J. Coppins, D.L. Hawskworth, P.W. James & D.M. Moore. London: Natural History Museum Publications with the British Lichen Society. 1992. Lichenologist 26: 217-220.

Fletcher A (2008) Taxonomist – An endangered species. British Lichen Society Bulletin 103: 2-6.

Galloway DJ (2007) Flora of New Zealand: Lichens, including lichen-forming and lichenicolous fungi. 2nd edn. 2 vols. Manaaki Whenua Press, Lincoln, New Zealand.

Hawksworth DL, Blanco O, Divakar PK & Crespo A (2008) A first checklist of parmelioid and similar lichens in Europe and some adjacent territories, adopting revised generic circumscriptions and with indications of species distributions. Lichenologist 40: 1-21.

Hitch C[JB] (2009) New, rare and interesting lichens. British Lichen Society Bulletin 104: 42-52.

Kirk PM, Cannon PF, Minter DW & Stalpers JA (eds) (2008) Ainsworth & Bisby's dictionary of the fungi. 10th edn. CAB International, Wallingford.

Lumbsch HT & Huhndorf SM (eds) (2007) Outline of *Ascomycota* – 2007. Myconet 13: 1 – 58 [http://www.fieldmuseum.org/myconet/outline.asp].

Purvis OW, Coppins BJ, Hawksworth DL, James PW & Moore DM (eds) (1992) The lichen flora of Great Britain and Ireland. Natural History Museum Publications, London.

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The macrolichens of New England. By James W. Hinds & Patricia L. Hinds. 2007. The New York Botanical Garden Press, 200th Street and Kazimiroff Boulevard, Bronx, NY 10458-5126, USA <nybgpress@nybg.org>. Pp. xx + 584, figs 344 (mostly col.), tables 10. [Memoirs of the New York Botanical Garden no. 96.] ISBN 0-89327-477-1. Price US $65.

I first encountered this splendid book while teaching a class on lichenicolous fungi at the Eagle Hill Centre in Maine in July 2008, and wished I had known about it before so I could have commended it in advance to my students! It summarises all that is known of the macrolichens of the region based on 35 years of study by the authors – who had attended a course at the centre run by the late Mason Hale in 1988. New England embraces the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut. In all, 461 species distributed through 98 genera are treated, of which 28 are reported from New England for the first time and 20 excluded as doubtful. Descriptions are provided for all 461 species and a further 41 known from adjacent states. For each species, synonyms are given, and there are descriptions and notes on range, habitat, and diagnostic features. Each species is given a common name in English, a practice I would personally have preferred not to have seen – after all, who but the authors or users of this book are likely to know that the "Oceanic foam lichen" is *Stereocaulon intermedium*! More importantly, there are superb colour photographs showing the habit of 308 species that are amongst the best I have ever seen.

There is an extensive introduction, including 37 pages of generic keys grouped first by substrate and then habit and colour, and also discussions on the status of species. Helpfully, there is a "Quick key index" on the inside of the front cover, and a map of the counties in the states covered on the inside of the back one. Keys to species within genera appear in the body of the text. With respect to status, sadly, 61 species have not been recorded seen since 1950, and 257 (55.7 %) are considered regionally rare or declining. The book concludes with lists of excluded species, a glossary, and an index

As it deals with all, and not just a selection, of the reported species, this volume will surely become the standard reference for the identification of macrolichens in the northeastern USA and adjacent areas of Canada for the foreseeable future. The production is splendid, and the binding tough enough for the extensive use it will surely receive. The love of this husband and wife team for lichens seems to shine though every page. It is a tremendous achievement, and all amateur and professional lichenologists and ecologists working in the region should secure a copy.

Lichen flora of the Greater Sonoran Desert Region. Vol. 3. Edited by Thomas H. Nash III, Corinna Gries & Frank Bungartz. 2007. Lichens Unlimited, Arizona State University, Box 874501, Tempe, AZ 85287-4501, USA. Pp. viii + 567, figs 36, col. plates 56, maps. ISBN 0-9716759-1-0. Price US $ 49.95, 43 €.

This volume completes this stupendous work, the first volume of which appeared in 2002 (see Mycotaxon 86: 485-486, 2003) and the second in 2004 (see Mycotaxon 96: 350-351, 2006). Again it is very much a result of a productive international co-operation and has involved 47 authors from 15 countries. It covers the "balance of the microlichens, and the lichenicolous fungi" – actually 38 lichenized genera and four of lichenicolous fungi. In addition, there is further information on 16 genera covered in the previous volumes where further species have subsequently been discovered. This volume is especially valuable as it includes the treatments of some taxonomically difficult and speciose genera in some of which new species to science have also been discovered: for example, *Acarospora* with eight new species, *Aspicilia* with 19, *Buellia* with two, *Caloplaca, Opegrapha* with three, *Usnea* with three, and *Verrucaria* with seven. There are also numerous new combinations and even a new genus, *Romjularia* in *Porpidiaceae* for the species previously widely known as *Psora lurida*. In addition to a few half-tone photographs scattered through the volume, there is a signature of 56 un-numbered pages comprising excellent colour photographs of over 220 species – many more than in the previous volumes. These colour photographs are mainly of species treated in this volume but also include some not figured in colour in the previous two.

The overall layout naturally follows that of the previous volumes, and brings the total number of species covered in the three volumes to 1971, of which 1836 are lichenized – about 40 % of all the species known throughout the whole of North America. This last volume also has some special features: a key to sterile crustose lichens, a revised key to the cyanobacterial lichens, and a critical revision of the lichens reported from southern California in the classic treatise by Hasse published in 1913. There is also a cumulative index covering all three volumes, a compilation of the new scientific names introduced (which include 186 new species), and an index to where the major keys are found.

Of course there are the odd spelling slips, such as "*Sktyella*" for "*Skytella*" (p. 297), and other minutiae a persnickety reviewer might point out, but these hardly distract from what is essentially a meticulously and superbly edited work. That Tom Nash has been able to exert such editorial dragooning to achieve accounts of such a consistently high standard cannot but be admired. And to realize his vision with a product that bears such a modest price! It sets a new standard for regional works on lichens, covering as it does the full range of lichens and lichenicolous fungi in this vast region. Further, as so many of species treated occur elsewhere, not only in North America but the Northern Hemisphere, this trio of volumes is surely something all lichenologists will both

want, and can afford, to have on their personal shelves (the three volume set is currently available for just US $ 110).

Opredelitel' lishaininkov rossii. Vol. 10. Edited by Nina S. Golubkova. 2008. Nauka, St Petersburg, Russia. Pp. 516, figs 82. ISBN 978-5-02-026286-7. Price not indicated.

This is the tenth and final volume of the Handbook of the lichens of the USSR/Russia, which commenced publication in 1971 and is in Russian. The ninth volume appeared in 2004 (see Mycotaxon 94: 386-387, 2005) and covered *Fuscideaceae* and *Teloschistaceae*. In contrast, the new volume deals primarily with genera outstanding from previous parts, and disposed through 21 different families. In all, 54 genera and 467 species are covered here. Unlike the earlier volumes, the individual generic accounts are identified as contributed by 12 authors on the contents page at the end. The largest number of genera treated in one family (18) is *Physciaceae*, followed by *Gomphillaceae* (5) and *Psoraceae* (5), and the largest genera covered are *Ramalina* (with 48 species) and *Rinodina* (with 78). The format follows earlier volumes, with keys, full descriptions, information on ecology and distribution, and half-tone photographs of selected species. Some of the pictures are of a better quality than seen in earlier volumes, and those of *Ramalina* will be especially appreciated as some are of rarely illustrated species. Treatments of the basidiolichen genera *Multiclavula* (2 species) and *Lichenomphalia* (4 species) are also to be found here. The literature covered is more up-to-date than in some earlier volumes, with citations into 2006.

In addition to the index to scientific names in the current volume, there is a most welcome index to the volumes and pages on which genera are treated in all ten volumes (pp. 509-512) – I have inserted a coloured Post-it® in my copy to facilitate its rapid location in future.

The completion of this work is a great tribute to the dedication of lichenologists in the former USSR and Russia, as much of it has been produced under the most difficult of circumstances. Sadly, many of those involved in the earliest volumes, and two with the present one, did not live to see its completion; and Nina Golubkova herself, who has done so much for Russian lichenology, also died this year.

Nordic lichen flora. Vol. 3. Cyanolichens. Edited by Teuvo Ahti, Per Magnus Jørgensen, Hørður Kristinsson, Roland Moberg, Ulrik Søchting & Göran Thor. 2007. Nordic Lichen Society, Museum of Evolution, Uppsala University. Pp. 219, figs 1, maps 217, col. figs 232, photo CD. ISBN 978-91-85221-14-1. Price not indicated.

It has been a long gap since the second volume of this important work appeared in 2002, which focused on *Physciaceae* (see Mycotaxon **87**: 497-498, 2003),

but as pointed out by Per Magnus in the Preface, covering the lichens with cyanobacterial partners proved more difficult than at first perceived as many small genera had not been critically assessed in the region. Twelve families are covered, *Arctomiaceae* (2 genera), *Coccocarpiaceae* (1), *Collemataceae* (4), *Heppiaceae* (2), *Lichinaceae* (21), *Lobariaceae* (3), *Massalongiaceae* (3), *Nephromataceae* (1), *Pannariaceae* (9), *Peltigeraceae* (2), *Peltulaceae* (1), and *Placynthiaceae* (3). All accounts are authored by Per Magnus, apart from *Nephromataceae* and *Peltigeraceae,* which were prepared by Orvo Vitikainen. In cases where a genus also includes species that have only a green photosynthetic partner, these are also treated.

As only would be expected from these authors, the accounts are meticulously prepared, and largely follow the format of the earlier volumes. Maps for 217 species are included, along with 232 superb habit or detailed photographs in colour; an index to the collection details of the specimens photographed is provided. The CD contains the same photographs with separate files in two series, generic (with a file for each genus) and specific (a single alphabetical list). Of especial value amongst these are those of the undersides of *Peltigera* species, where the nature of the veins and rhizines are not always easy to grasp from the written word or sketches; I am sure those pages will soon become well thumbed!

Noting that there was a six-page appendix entitled "Nomenclatural novelties", I went to that with some trepidation at the name changes that might be introduced. But what a relief when I found there were just three new combinations, *Epiphloea byssina* (syn. *Collema byssinum*), *Pterygiopsis concordatula* (syn. *Pyrenopsis concordatula*), and *Thallinocarpon nigritellum* (syn. *Thyrea nigritella*), and 39 lecto-, neo- or epitypifications. Many of the epitypifications relate to names of common species based on illustrations in the 1742 Historia muscorum of Dillenius, and are welcome in now tying these names to specimens rather than figures. There is an index to synonyms, but surprisingly not to accepted species where I would have found one to epithets most helpful in view of the changing dispositions of some of the smaller species covered. Some other changes are found in the text, including the resurrection of the long-unused Massalongian generic name *Collolechia* dating from 1854 for the species previously referred to as *Placynthium caesium*; it differs from *Placynthium* in both thallus anatomy (crustose not squamulose) and apothecial characters (asci with an amyloid ring not a cap or sheath). I was also pleased to see the placement of *Thyrea nigritella* resolved (see above) as it has also featured in *Gonohymenia* and *Lichinella* in recent times.

While focused on the Nordic countries, as so many of the species are known elsewhere in Europe or are circumboreal, this is a work lichenologists in general should endeavour to acquire. It is to be hoped that further volumes in the series

will follow at a more timely pace and aspire to the high standards for the series now set by the third.

Flora of Australia. Vol. 57: Lichens 5. Edited by Patrick M. McCarthy. 2009. CSIRO Publishing, P. O. Box 1139, 150 Oxford Street, Collingwood, VIC 3066, Australia <publishing.sales@csiro.au>. Pp. xx + 687, figs 183, col. plates 32, maps 654. ISBN 978-0-643-09664-6 (hard cover), 978-0-643-09665-3 (soft cover). Price AU$ 180 (hard cover), AUS$ 140 (soft cover).

The lichen volumes in this "flora" started publication in 1992, when five were originally envisaged (vols 54-58) with particular ones covering specified orders and families. The first to be issued (54, 1992) had a substantial introduction and dealt with nine families of *Lecanorales,* the second (55, 1994) *Parmeliaceae,* the third (58A, 2001; see Mycotaxon 83: 505-506, 2002) genera from ten families taken from seven orders, and the fourth (56A, 2004; see Mycotaxon 91: 514-515, 2005) nine families from three different orders. A changed policy has been adopted for the fifth volume, which is about twice the thickness of any of the previous four. Now, it is envisaged that the work will comprise ten volumes published at intervals of 1-2 years "as sufficient treatments of complete families become available" (p. xi). This is surely a more pragmatic approach to the eventual realization of the vision of this massive work, especially as with so few Australian lichenologists in posts it is partially dependent on contributions from specialists in other countries.

The new volume has partial or complete accounts of 21 families, and according to the Introduction (p. xi) covers 78 genera and 654 species and infraspecific taxa, bringing the total so far covered in the five volumes to a most commendable 1822. The major part of the present volume (338 pp.) is devoted to *Ostropales*: *Graphidaceae* (AW Archer) and *Thelotremataceae* (A Mangold, JA Elix & HT Lumbsch) – families that are kept distinct for practical reasons here despite their synonymy having been proposed. To see *Graphidaceae* included was at first something as a surprise in view of the 2006 revision by Archer (see Mycotaxon 107: 521522, 2007), but on closer inspection this proved not to be just a re-formatting, but to have not only many additional species but even further genera recognized; this reflects the rapid advances made in the understanding of the family even in the last three years. Other of the larger contributions deal with some of the smaller genera of *Arthoniaceae* (JA Elix), *Nephromataceae* and *Peltigeraceae* (SHJJ Louwhoff), *Pyrenulales* and *Trypetheliales* (A Aptroot), selected genera of *Teloschistales* (including *Buellia* and *Dirnaria*; JA Elix), and *Umbilicariaceae* (SHJJ Louwhoff). Various new scientific names are proposed, including *Schizotrema* gen. nov. (*Thelotremataceae*), 27 new species (mainly in *Thelotremataceae*), and 36 new combinations made (sadly none with MycoBank accession numbers).

The overall format is essentially that of earlier volumes, but particularly welcome here are the numerous halftones in the text; many are just macroscopic, but those showing ascospores in the accounts of the thelotremes will prove especially useful. However, I do hope that more colour plates can be included in future volumes, as these are especially valuable to newcomers to lichen identification. The whole has been meticulously edited, though I did find the frequent and incorrect practice of citing the authors after species epithets in the names of infraspecific taxa other than the type taxon a minor irritation. The volume merits a wide distribution not only amongst lichenologists concerned with Australian material, but all dealing with tropical and Southern Hemisphere lichens.

Biologia de líquens. Edited by Lauro Xavier Filho, Maria Estrella Lopez, Carlos Vicente Cordoba, & Eugênia Cristina Pereira. 2006. Âmbito Cultural Edições, Rua da Alfândega 115 Sala 704, Centro, Rio de Janeiro- RJ, Brazil. Pp. 619, figs, some col. ISBN 85-86742-14-7. Price 100 R$.

This is essentially a multi-authored textbook in Portuguese, with contributions from 25 lichenologists mostly based in Brazil or Spain. In many respects it is an update of Xavier Filho's (1976) text, which has been the only general work on lichens available in Portuguese since that time. It is mentioned here as while mainly devoted to lichen structure, chemistry, ecology, and physiology, it also includes a synopsis of the orders of lichens known in Brazil, and further keys to the genera of foliicolous lichens – the latter prepared by Robert Lücking and Marcela Cárceres.

Xavier Filho L (1976) Manual de liquenologicia Brasileiro. Universidad Federal de Pernambuco, Recife.

Facetten der Flechtenforschung Festschrift zu ehren von Volkmar Wirth. Edited by Roman Türk, Volker John & Markus Hauck. 2008. Verlag Alexander Just, P. O. Box 53, Dorfbeuren, A-5010 Salzburg, Austria <verlag.just@utanet.at>. Pp. 616 + viii col. pl. [Sauteria no. 15.] ISBN 978-3-901917-08-0. Price 49 €.

Volkmar Wirth is one of the most respected lichenologists in Europe, so it is not surprising that this volume dedicated to him on the occasion of his 65th birthday attracted 33 contributions from specialists across the continent. These range from descriptions of new species to records from different regions from the Galapagos and Iran to Belgium, and include notes on some lichenicolous fungi. Of special note is the paper recognizing an additional species of *Parmelina* in Europe (*P. atricha*), that providing a revised circumscription of *Xanthodactylon*, and one with the realization that *Cheiromycina ananas* is a synonym of *Dictyocatenulata alba*. Also very welcome is the late Anton Vězda's index to his Lichenes selecti exsiccatae, 1960-1991) which comprises

2500 taxa of lichens and lichenicolous fungi. The volume concludes with a list of Wirth's 160 publications in the period 1963-2008, and a list of the new scientific names for both taxa and lichen communities he has introduced. While I am sure that Volkmar will have appreciated the volume, I continue to question the value of such Festschrifts as opposed to dedicated issues of regular lichenological journals as sadly the papers will not be readily accessible to most lichenologists.

Checklist of lichens and allied fungi of the Polish Karkonosze Mts. By Maria Kossowska. 2006. W. Szafer Institute of Botany, Polish Academy of Sciences, Lubicz 46, PL-31-512 Kraków, Poland <ed-office@ib-pan.krakow.pl>. Pp. 131, figs 1. ISBN 978-83-89648-50-1. Price not indicated.

The Karkonosze Mountains are the highest in the Sudety Mountain range, reaching an altitude of 1603 m, and form a boundary between the Czech Republic and the former Silesia (now in Poland). The area has been studied by many well-known lichenologists from Flotow to Suza over the last 250 years, and this work aims to bring together information on the Polish side of the mountains. In total, 574 lichens and 22 allied fungi (i.e. lichenicolous or saprophytic species) are confirmed, while in the case of a further 17 it is unclear as to which side of the divide they were collected. Information as to the current status of species in the Mountains is not indicated and must await fresh field surveys, which this book could well help to stimulate. The arrangement is strictly alphabetical, with details of occurrences by region and with literature references. There is also an index to synonyms, and a German/Polish (Czech) gazetteer as wrestling with changing place names in the region is evidently a nightmare!

Biotic soil crust lichens of the Columbia Basin. By Bruce McCune & Roger Rosentreter. 2007. Northwest Lichenologists, 1840 NE Seavy Avenue, Corvallis, OR 97330, USA (www.nwlichens.org). Pp. iv + 195, col. figs. [Monographs in North American lichenology no. 1.] ISBN 978-0-9790737-0-0. Price US $ 30.

This is a super hands-on identification guide to an ecologically most important habitat: "Break your skin and blood emerges; break the skin of the earth and mineral soil emerges" (p.1). Following five pages of introduction, including information on collecting and curating (always a problem with lichens on friable soils!), 21 keys are presented arranged into six pragmatic sections: blackish; crustose yellow or orange; nonlobate crusts; fruticose or 3-D; lobate or foliose; and squamulose. Where species are keyed out, rather full descriptive information is provided, but what really makes this volume so special is the coloured photographs and photomicrographs. As the authors point out, "almost none of the lichen species growing in biotoc crusts in the Pacific Northwest

have been illustrated with colour photos in sufficient magnification and detail for confident identification" (p. 1). Not only are the habits shown in the photographs, but there are sections of ascomata, pictures of asci and ascospores, and even ones showing differential responses to UV-light. There are also asides on topics such as vagrant and erratic lichens, and a well-illustrated glossary. Unexpected in what is designed to be primarily a field guide is a new taxonomy for *Rhizoplaca* in the region, including the formal diagnosis of one new species and three new subspecies. A "must" for ecologists and lichenologists alike, and a great start to what promises to be a most important and much needed series of monographs on North American lichens. All concerned in the realization of such a super volume at such a reasonable price are to be congratulated.

Cladoniaceae. By Ana Rosa Burgaz & Teuvo Ahti. 2009. Sociedad Española de Liquenología, Madrid, Spain. Pp. 111, figs 21, maps 82. [Flora Liquenológica Ibérica vol. 4.] ISSN 1696-0513. Price not indicated.

The previous volume in this series, published in 2007, dealt with the crustose genera *Bacidia* and *Bacidina* (see Mycotaxon 102: 449-450, 2007). This new number is especially welcome as dealing with a whole family, *Cladoniaceae*, which has two genera in the Iberian Peninsula; *Cladonia* with 81 species and subspecies, and *Pycnothelia* with just one. *Cladonia* is particularly species rich worldwide, with around 450 currently accepted species, and they can be notoriously difficult to identify. "Ted" Ahti has devoted much of his life to resolving species concepts and nomenclature in the genus in all continents, and Ana Rosa is one of Spain's most experienced lichenologists who has taken an especial interest in the genus in the Iberian Peninsula for many years. This combination of skills has had a synergistic effect in enabling this regional monograph to be realized. The text is entirely in Spanish, and after some general background on the family and its study plunges quickly to the keys. These lead to the characterization of four "supergroups": *Cladonia* (most species, with a squamulose primary thallus and brownish apothecia), *Cocciferae* (*Cladonia coccifera* and other species with red apothecia), *Crustaceae* (with a crustose primary thallus, and including the formerly recognized *Cladina* and the *Cladonia uncialis* group), and *Perviae* (*Cladonia crispata* and other species with perforated podetia). A combined key covering all species treated follows, with generally clear-cut dichotomies that could easily be followed, with the aid of a pocket dictionary, by those not conversant with Spanish. I was relieved to see that the species entries themselves were arranged alphabetically by epithet and not by supergroup, as this makes looking up species so easy. Each account has the essential nomenclatural information on place of original publication of the name, and basionym where appropriate, along with details of the type and references to selected published illustrations. The descriptions are more

detailed and meticulously prepared than is often seen for ones of macrolichens, and include anatomical details of the thalli and podetia as well as chemistry. The ecological notes reflect the extensive experience of the authors in the field, and distribution down to community (province) and state level is summarized and also shown in dot-maps collected together to the back of the volume. Many of the species have wide distributions, and some have only recently been recognized in Europe, such as *C. hammeri* described from California in 2002. But there are also endemics or near endemics, including *C. iberica* which I frequently see in the mountains just to the north of Madrid. There are no photographs, but most species are illustrated in clear life-like line drawings by J. L. Castillo; 3-4 are presented together in each plate. Notes on four species that might be expected in the region and to be searched for are also included. This is a *must* for the shelf near the bench of all lichenologists working with macrolichens.

The montane heathland lichen guide. By Andrea Britton. 2008. The Macauly Institute, Craigiebuckler, Aberdeen AB15 8QH, UK <j.lund@macauly.ac.uk>. Pp. 50, col. figs. ISBN not indicated. Price £ 10.99.

A spiral-bound, coloured, and reputedly waterproof guide at a size that will easily slip into the side pocket of a backpack. The focus is species in the prostrate montane shrubs of Scotland's highest mountains. It has pragmatic information on identification, chemical testing, preservation, and collection – with a strong warning on unnecessary collection. This is wise as I suspect there is already more of one species that is mentioned (but not illustrated), *Alectoria ochroleuca,* in herbarium cabinets than growing today in Scotland. Twenty-seven species are featured, mostly at one per page, with fine habit photographs and notes on the characters, chemical tests, habitat, and similar species, as well as a 10 km square distribution map. *Cladonia* species predominate, especially bushy species (i.e. subgen. *Cladina*) to which there is a "simple key". The photographs are at a sufficiently high magnification to show the apical branching patterns, and most must have been taken from fairly fresh material as the colours all seem true to nature. I would, however, have preferred that of *Solorina crocea* to be at a higher magnification so the veins on the bright orange underside were visible. There is also a "complete list" of terricolous species found in this habitat in the UK, which includes crustose species as well as macrolichens. The author is a plant ecologist, so it is perhaps not surprising to find a table showing the occurrences of species in 11 National Vegetation Classification (NVC) categories, of which three have a major lichen component: *Calluna vulgaris-Cladonia arbuscula* heath, *Vaccinium myrtillus-Cladonia arbuscula* heath, and *Juncus trifidus-Racomitrium lanuginosum* heath. The booklet concludes with a glossary and recommended further reading and websites. It will be a boon

to ecologists undertaking survey work in montane heathlands, and neophyte lichenologists struggling to identify *Cladonia* species.

Lichen Flora of Central India. By S. Muthukumar & J. L. Tarar. 2006. Dattsons, J. Henru Marg, Sadar, Nagpur 440001, India. Pp. x + 360, plates 28, tables 3. ISBN 81-7192-062-4. Price US $ 54, Rs 975.

While it is pleasing to see more books being produced on Indian lichens, this one has some unexpected features that set it apart from most regional treatments, and also problems as a work of the 21st century. These include a detailed and extensively referenced account of the history of lichenological exploration in India, a review of phytogeography and distribution in India (including principal phytosociological syntaxa), overviews of thallus and reproductive structures, and a survey of economic uses. The major part of the book, however, comprises ten chapters each devoted to particular groups or genera of lichens: arthonioid, graphidean, thelotremoid, lecideoid, opegraphoid, *Parmelia*, *Pertusaria*, *Pleurothecium,* pyrenocarpous lichens, and *Usnea*. However, these are not straightforward systematic accounts with keys for identification, but rather discursive essays with eclectic systematic material – and do not all have parallel contents.

For example, the chapter on graphids starts with an introduction to the family, first in India and then historically from 1724, followed by considerations of the criteria for generic and species delimitations. In this, the now outdated artificial four-genus system used by Zahlbruckner in the 1920s is used with no mention of Staiger's (2002) seminal work and the generic concepts she adopted. The morphology of the discs, the nature of the "labia", and convergence/divergence in these features are then discussed, leading to a consideration of exciple structure, ascospores (with five size categories), and chemistry; these characters used to place the species in 14 categories in a Table (pp. 86-87). An "Appendix" aiming to list all taxa of the family previously recorded from India follows, with references, and in which those known from central India are asterisked (six of 113 species). The four genera are then treated in turn, with a key, descriptions, and information on the ecology and distribution of each species. Taking *Graphina* as an example, 41 species are listed as previously known from India with just three asterisked as present in central India, while the subsequent key and species descriptions cover 11 of which eight are not in the list of 41; these I presume are those now known in central India and include taxa discovered by the authors.

The longest chapter, of 50 pages, is titled "a treatise to pyrenocarpous lichens." This lacks a key to the genera, which are just listed under five spore

categories, but has keys to species within the accepted genera. Amongst these I was amazed to see *Microthelia* still being used, and for a variety placed as a synonym of *Mycomicrothelia conothelena* many years ago (Hawksworth 1985). But there are even stranger and potentially misleading points, such as the treatment of *Buellia* and *Dermatocarpon* in the arthonioid lichen chapter. Macrolichens receive but cursory treatment, and apart from *Dermatocarpon* only *Parmelia* s. lat. (four species) and *Usnea* (one) make the book. In the case of *Parmelia*, most generic segregates proposed by Hale are not mentioned, let alone the changes in generic concepts that have arisen from the intensive molecular phylogenetic studies that started publication around the turn of the century. Such misunderstandings and lack of expected comments may be partly understandable in the context of the 26-page Reference section; the only papers cited that appeared after 1990 are by Indian authors, and the latest of those are ones by the two authors of this book and are only from 2000. No information from molecular phylogenetic studies or recent classifications has consequently been considered.

In addition to a short glossary, each page idiosyncratically ends with a rule below which is a statement of some lichenological "fact"; examples include "Lichen in shade accumulate more chlorophyll content," "The growth of lichen is normal sigmoid pattern," and "Crustose species germinates in 1 or 2 hours" – many of the comments would not withstand critical scrutiny . . .

So how can this work be summarized? It is not an overall account of the lichens of the region, indeed there is only a key to the genera treated. But it apparently did have a mission, which is expressed in the Preface: it was "moulded to exemplify lichen taxonomy by adhering to spore based concepts for delimitation of taxa" (p. vi); i.e. a long-lost cause. It is unfortunate that the authors appear not to have had access to much modern literature or guidance. There are no acknowledgements, even to assistance received from other Indian lichenologists, and sadly they appear to have worked diligently but very much in isolation. However, Dr Muthukumar only received his PhD in 2000, from a university in Nagpur, and the back flyleaf indicates that he is now researching the lichens of the Marathwada region; hopefully he is now also making contact with other lichenologists who can induct him into current systematic concepts and the modern literature.

Hawksworth DL (1985) A redisposition of the species referred to the ascomycete genus *Microthelia*. Bulletin of the British Museum (Natural History), Botany 14: 45-181.

Staiger B (2002) Die Flechtenfamilie *Graphidaceae*: Studien in Richtung einer naturlicheren Gliederung. Bibliotheca Lichenologica 85: 1-526.

Macrolichens of Sikkim. By G.P. Sinha & K.P. Singh. 2005. Botanical Survey of India, 5th & 6th Floor, F-Wing, C. G. O. Complex, Salt Lake City, Kolkata 700 064, India <bsi_headquarters@rediffmail.com>. Pp. iii + 273, col. figs 95 [?], maps 1, tables 1. ISBN 81-8177-011-0. Price Rs 1080, US $ 115.

This is a very different work to Muthukumar & Tarar's account of the lichens of central India considered above, and is prepared by two of India's current generation of active lichenologists. It is the result of six years of intensive collecting on 12 expeditions in the years 1994-2000 which ranged up to an amazing 5500 m in altitude. The 1775 collections made were "authenticated" using the collections in the National Botanical Research Institute in Lucknow, which have been built up mainly by India's most renowned lichenologist, Dharani Awasthi, and assistance was also secured from other lichenologists with particular specialisms both within India and internationally. It starts with a succinct and pertinent 14-page introduction providing background to the region, detailing the history of its lichenological exploration, and presenting key aspects of the strikingly different habitats and lichens found in them from the tropical to the alpine (also shown in colour). Twelve lichens that have uses to local people in the state are also enumerated; these have vernacular names and are used for purposes from treating eczema and urinary troubles to consumption as vegetables. Prior to this study, 248 species were known from the state. That total has now been increased to 320 species, of which six are first records for India. Seven species are only so far known from the state, and others confined to the Eastern Himalayan region and Tibet occur. There is a key to the 72 genera represented, and then accounts of the families and genera; frustratingly these are arranged by family rather than alphabetically, according to a classification that is not explained and which separates families now known to be the same (e.g. *Caliciaceae* starting on p. 24 and *Physciaceae* on p. 171); the index consequently needs frequent consultation, especially as the page numbers for the generic accounts are not cited in the generic key. Each genus has a description and comment on the species numbers worldwide and in the region, a key where more than one is represented, and species accounts have the full bibliographical reference to their place of publication and selected usages, a description, notes on ecology and distribution, and a list of specimens examined. In addition, just under a third of the species are illustrated by colour photographs, not all as sharply focused as one might expect today, and mostly evidently taken from preserved specimens to judge from the background material and especially the colours – users need to be aware that the colours are not always the same as they would be in fresh specimens. However, I was particularly surprised by the picture of *Sulcaria virens* which appears reddish orange rather than bright emerald green as in my experience the true colour is maintained well even in ancient collections! In contrast to that example, the

yellow shown in *Alectoria ochroleuca* is true to nature. The species illustrated include a number which have surely not previously been featured in colour, such as *Heterodermia himalayensis* and *Umbilicaria yunnana*. Generic concepts are in general up-to-date, though in the case of the parmelioid lichens the changes arising from the last round of molecular phylogenetic studies are not allowed for as they would have appeared too late. In summary, a solid contribution to the lichens of this fascinating region, and one which will be of particular value to all endeavouring to identify macrolichens from the highest altitudes in the Himalayan and adjacent regions.

[Lichen identifier]. By Wanaeuk Saipankaew et al. 2007. British Council, Chiang Mai, Thailand <www.britishcouncil.or.th>. Pp. vi + 82, illustrated. ISBN 974-94705-8-3. Price not indicated.

This little spiral-bound book, in Thai apart from the Foreword and last six pages, provides an introduction to the nature and identification of lichens, along with coloured photographs of species illustrating a selection of common genera in the country, and an introduction to recording as a part of air quality surveys – an issue of ongoing concern in and around urban centres in Thailand. It is mentioned here as having so much material in Thai it will be useful in introductory courses on lichens in the country.

Miscellaneous

Species: A history of the idea. By John S. Wilkins. 2009. University of California Press, Berkeley, CA, USA . Pp. xiv + 306, figs 11 [Species and Systematics Vol. 1.] ISBN 978-0-520-26085-6. Price £ 34.95.

It is instructive for mycologists involved in the description and circumscription of new species to be aware of the practices in other areas of biology. This is far from the first book to examine species concepts, but complements others of recent years on my shelves, such as those of Claridge et al. (1997), Wilson (1999), and Wheeler & Meier (2000). Not only is it single-authored, and by a philosopher of science rather than a practicing taxonomist, it goes to the roots of the origin of the concept. The evolution of the idea is traced in depth from the emerging concept of Aristotle in classical times, through the medieval to the birth of modern science, the nineteenth century debates and the impact of Darwin, to the "new systematics" synthesis of the early twentieth century and modern debates. The modern debates receive only 19 pages, and at first this seems too little, but perhaps they are to be expanded in future volumes in this new book series? However, this section does address reproductive isolation, evolutionary, phylogenetic and other less familiar concepts such as the ecological, the "aberrant" (including agamo-, nothospecies), and the

palaeontological. Wilkins concludes that "species has always been thought to mean the generation of similar form," and perhaps more surprisingly that "there has been no morphological species tradition as such, apart from the use of morphology to identify species" (p. 232; his emphasis). No neatly packaged definition emerges, instead he suggests that we "might stop trying to overgeneralize species concept(ion)s or speciation mechanisms to all species" which would "reduce the heat in a number of biological forums" (p. 234). These are sentiments with which I definitely concur, and seem in line with my personal pragmatic species concept I both employ and commend: "species are groups of individuals separated by inheritable character discontinuities and which it is useful to give a species name to" (Hawksworth 1996: 32).

Claridge MF, Dawah HA & Wilson MR (eds) (1997) Species: the units of biodiversity. Chapman & Hall, London.

Hawksworth DL (1996) Microbial collections as a tool in biodiversity and biosystematic Research. In: Culture collections to improve the quality of life (RA Samson, JA Stalpers, D van der Mei & AH Stouthamer, eds): 26-35. Centraalbureau voor Schimmelcultures, Baarn.

Wheeler QD & Meier R (eds) (2000) Species concepts and phylogenetic theory: a debate. Columbia University Press, New York.

Wilson RA (ed.) (1999) Species: new introductory essays. MIT Press, Cambridge, MA.

Taxonomic Literature. Supplement VIII: Fres–G. By Laurence J. Dorr & Dan H. Nicolson. 2009. A. R. G. Ganter Verlag, FL-9491 Ruggell [Distributed by Koeltz Scientific Books, P. O. Box 1360, D-61453 Königstein, Germany <koeltz@t-online.de>]. Pp. viii + 550. [Regnum Vegetabile Vol. 150.] ISBN 978-3-906166-75-9. Price 94 €, US$ 141.

This publication completes the "supplement" to the first volume of what has become affectionately known as "TL-2" – the second edition of the standard reference work Taxonomic Literature prepared by the late Frans A. Stafleu and the late Richard S. Cowan. The eight supplements, the first of which appeared in 1992, expand the coverage in the first volume which treated works by authors A through G in a more eclectic manner than that accorded to authors in the six other volumes of the main work. This final supplement, bring the total number of volumes constituting TL-2 to 14, will be especially appreciated by mycologists as it treats six more of works by Elias M. Fries, which can be added to the 34 of his publications covered in the 1976 volume. There is also a synopsis of three generations of the Fries family, several members of which made important scientific contributions in various aspects of botany and mycology. The complete set is a must for all libraries dealing with botanical and mycological (including lichenological) taxonomy and nomenclature, and also those involved in editing taxonomic works.